THE CLINICAL MORPHOLOGIES.

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EPHRAIM CUTTER, M.D., LL.D., Hon. F.S.Sc. (Lond.).

Use of Clinical Microscope, 1-10 inch objective, with direct light of candle.

PARTIAL SYLLABIC LISTS

OF THE

CLINICAL MORPHOLOGIES

OF

THE BLOOD, SPUTUM, FECES, SKIN, URINE, VOMITUS, FOODS, (INCLUDING POTABLE WATERS, ICE AND THE AIR), THE CLOTHING, UTERINE AND VAGINAL DISCHARGES, AND SOILS

BY

EPHRAIM CUTTER, M.D., LL.D.

"A capacity to do good not only gives a title to it, but makes the doing of it a duty."—*Duke of Brandenburg*, 1691

SECOND EDITION

JUN 17 1892
WASHINGTON.

NEW YORK

PUBLISHED BY THE AUTHOR

1892

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NEW YORK.

CONTENTS.

PAGE

I. The Morphology of the Blood—Mode of Study, . 1

A. General list of the Morphology of the Blood in Health and Disease, 3; The Colored Corpuscles, 3; The Colorless Corpuscles 4; The Serum, . 4

B. Morphology of the Blood in Health, . . 7

C. Movements and Changes of the Blood in Dying, . 9

D. Morphology of the Blood in Consumption of the Lungs; Use, 9; First or Incubative Stage 10; Second Stage, of Transmission, 10; the Third Stage or Stage of Tubercular Deposition 12; Fourth Stage, Interstitial Death, . . . 12

E. The Morphology of the Blood in Rheumatism, . 13

F. Fibræmia, ... 17

G. Thrombosis, ... 17

H. Embolism, ... 18

I. Pre-embolic State, ... 18

J. Anæmia, ... 18

K. Pernicious Anæmia, ... 19

L. Morphology of the Blood in Syphilis, . . 19

M. Morphology of the Blood in Eczema, . . 20

N. Morphology of the Blood in Scrofula, . . 21

O. Morphology of the Blood in Malaria, . . 21

P. Hereditary Taints, ... 22

Q. Cancer, ... 23

R. Morphology of the Blood in Variola and Vaccinia, 23

S. Morphology of the Blood in Typhoid Fever, . 23

T. Morphology of the Blood in Scarlet Fever and Diphtheria, ... 24

U. Morphology of the Blood in Fatty Degeneration, . 24

V. Morphology of the Blood in Fibrous Consumption, 25

PAGE

W. Cholesteræmia, ... 25
X. Morphology of the Blood in Carbuncle, . 26
Y. Morphology of the Blood in Yellow Fever, . . 26
Z. Leucocythæmia, ... 26
II. Morphology of the Sputum, ... 27
III. Morphology of the Feces, ... 33
IV. Morphology of the Skin, ... 38
V. Morphology of the Urine, ... 43
VI. Morphology of the Vomitus, ... 48
VII. Morphology of Foods, ... 49
A. Waters of Lakes, Ponds and Water sheds; Hydrant Waters, 49; List, 50; Appendix, . . 54
B. Waters of Springs and Wells unconnected with Lakes or Ponds, ... 58
C. Ice, 63; List, 64; Appendix, ... 65
D. Air, 70; List, ... 72
E. Morphology of Foods; Animal and Vegetable, 74; Vegetable: Uncooked, 74; Cooked, 75; in the Feces, 75, 76, 77. Beefsteak: Uncooked, 76; Cooked, 76; in the Feces, 76; Adulteration, 77; Infants' Foods, ... 78
VIII. Morphology of Clothing, ... 80
IX. Morphology of the Uterine and Vaginal Discharges, 82
X. Morphology of Soils, ... 84
List of Lantern Slides, ... 86

PLATES.—The Blood and Sputum.

PAMPHLETS.—Food versus Bacilli in Consumption.
On the Death of a Cured Case of Tuberculosis Pulmonalis.
Male Neurasthenia.
Fatty and Fibroid Degenerations.
Cleaned Whole Wheat.

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OF THE

CLINICAL MORPHOLOGIES

OF

THE BLOOD, SPUTUM, FECES, SKIN, URINE, VOMITUS, FOODS, INCLUDING POTABLE WATERS, ICE AND THE AIR, AND THE CLOTHING (AFTER SALISBURY).

BY

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NEW YORK

THE ARISTON, BROADWAY AND 55TH STREET

PUBLISHED BY THE AUTHOR

1888

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Dedication.

This work is respectfully dedicated to the following, who have shown themselves searchers after medical truth and courteous to co-laborers.

Benjamin Cutter, M.D., A.M., in memoriam, summa laude
J. Marion Sims, M.D., LL.D., in memoriam, summa laude
E. S. Gaillard, M.D., LL.D., in memoriam, summa laude
Louis Elsberg, M.D., in memoriam, summa laude
George Waterhouse Garland, M.D., in memoriam
George M. Beard, M.D., in memoriam, summa laude
S. D. Gross, M.D., LL.D., D.C.L., in memoriam, summa laude
Frank H. Hamilton, M.D., LL.D., in memoriam, summa laude
James R. Nichols, M.D., in memoriam, summa laude
Washington L. Atlee, M.D., in memoriam, summa laude
Professor L. A. Sayre, M.D.
Professor T. G. Thomas, M.D.
Professor Albert Vander Veer, M.D., Ph.D.
Professor R. J. Nunn, M.D.
Professor T. E. Murrill, M.D.
Professor T. E. Satterthwaite, M.D.
Professor Joseph Jones, M.D.
Professor Jacob Cooper, M.D., Ph.D., J.C.D., S.T.D.
Professor Wm. B. Atkinson, M.D., A.M.
Professor Byron Stanton, M.D.
Professor J. Solis Cohen, M.D.
Professor W. W. Dawson, M.D.
Professor Samuel B. Ward, M.D., Ph.D.
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David Prince, M.D.
Alfred C. Garratt, M.D.
G. L. Simmons, M.D.
W. Symington Brown, M.D.
Jonas C. Harris, M.D.
Austin W. Thompson, M.D.
Samuel W. Abbott, M.D., M.A.
J. J. Mulheron, M.D.
R. E. Thompson, M.D., F.R.C.P. Lond., summa laude
Henry O. Marcy, M.D., LL.D.
J. N. Hyde, M.D.
Landon B. Edwards, M.D.
Sir James Grant
Professor Aust-Lawrence, M.D.
D. H. Goodwillie, M.D.
Professor A. B. Arnold, M.D.
R. U. Piper, M.D.
W. R. Weisager, M.D.
Professor Domingos Freire, M.D.
Caleb Green, M.D.
A. F. Pattee, M.D.
Fr. Ecklund, M.D.
Professor E. A. Wood, M.D.
Professor M. C. White, M.D.
M. G. Wheeler, M.D.
Henry C. Bunce, M.D.
Sir Morell Mackenzie

AND

TO MY INSTRUCTORS

James H. Salisbury, M.D., LL.D., maxima laude
Professor Paulus F. Reinsch
Professor J. P. Cooke, M.D.
Professor Oliver Wendell Holmes, M.D., LL.D., D.C.L.
Rev. Joseph Cook
George B. Harriman, D.D.S.

Robert B. Tolles, in memoriam

INTRODUCTION TO THE MORPHOLOGIES.

It is now over ten years since the writer first applied this word to the account (logos) of the forms (morphos) found in the blood, sputum, fæces, urine, etc., and its general adaptation seems to justify the use of the term. It was employed to facilitate the introduction of the thoughts and results embraced in The Relation of Alimentation to Disease* by J. H. Salisbury, M.D., LL.D., the master discoverer and explorer.

The morphologies of his discoveries are over twenty-five years old. The number of people who have been cured by the thorough and systemic plans based on them is such that there is no need of apologizing for bringing them more prominently to notice, but rather of apologizing that they have been kept back so long. The writer has not ceased night and day to urge their publication, and he is permitted to hint gently that, if what has now been issued is well received, much more valuable

* New York: J. H. Vail & Co., 1888.

treasures will be dispensed from the storehouse to all who ask for them.

Those who gain a tolerable knowledge of these lists will expect, among other things, to diagnosticate consumption of the lungs in (1) The pretubercular state; (2) In the invasion stage; (3) In the breaking down stage. To diagnosticate syphilis at once. To diagnosticate rheumatism, in its various forms. To diagnosticate fibræmia, anæmia, leucocythæmia, malaria, diseases of fatty degeneration, sclerosis, locomotor ataxy, impending apoplexy, and paraplegia, etc., etc. To diagnosticate a state of perfect health, a tendency to diseased conditions, etc., etc.

Since nearly a quarter of a century has been spent on these morphologies, it cannot be claimed that they are hastily gotten up; still the lists are all partial, subject to addition and subtraction, as need requires. They may be taken to represent the actual state of knowledge at the present day, which is quite an advance over a quarter of a century ago.

PREFACE.

For some years the writer has needed a published list of the clinical morphologies for the use of his pupils. He has waited long to have the lists complete, but in vain. Complete knowledge of any subject is about as rare as a completed city. Knowledge is ever on the increase, like most of our cities. We use our cities even if incomplete, so must we use our knowledge as far as it goes.

One object of this work is to show the height and depth, the length and breadth of the so-called Salisbury plans; that they are entitled to respectful hearing; that they include a wide survey and comprehensive grasp of the world that comes in contact with our bodies, outside and in; that they have no narrowness of range nor contraction of vision; that they deal with facts more than with opinions; that the tests to which they may be subject are close at hand and near to reach. *They are cis- not transatlantic.*

These morphologies also show that the writer has not ridden a one-horse hobby in satisfying his mind of the truth of the plans named, but

that he has endeavored to take broad views of all the evidence in the matter before coming to conclusions.

It has been suggested that the writer give a short history of his relation to these subjects. In justice to all concerned, and to make shorter work, the personal pronoun will be used, mostly.

I began the use of the microscope as a means of education and useful knowledge, if my memory serves me rightly, in the Sheffield Scientific School of Yale College in 1850. The winter of 1853–4 I spent in Professor J. P. Cooke's private laboratory, working up the morphologies of blood and urine, together with their micro-chemistry. Besides him, I have studied under Dr. O. W. Holmes, Col. J. J. Woodward, G. B. Harriman, D.D.S., Professor Paulus F. Reinsch, the highest authority in algæ; and Dr. James H. Salisbury. The last gentleman excels all others in the amount of original information which I have found of priceless need and value in medicine. Before studying medicine, I was inspired with a desire to know all I could about the causes of disease. Having, from a child, been in the habit of accompanying, in his professional rounds, my father, the late Dr. Benjamin Cutter, of Woburn, Mass. (who honored his profession for forty years), I early took in the idea that there was a great field of much-needed effort, from the chance remarks he would drop

when he resumed his seat in the carriage (which I kept) after having seen some very sick patients. He said often, "Oh, how I wish we doctors knew more as to the real causes of disease." This impulse was much strengthened by his telling me (when I informed him that I did not want to study medicine to practice it, but only to know the causes of disease), "Go ahead; study all you can. I will help all I can, but I want you to study these three things.

"1. What is the cause of consumption.

"2. What is the cause of the diseases of women.

"3. What is the cause of diseases of the nervous system.

"We doctors do not know anything about them." And yet this was a surgeon who successfully, without anæsthesia, opened the knee joint and removed a free cartilage (assisted only by the writer when twelve years old).

The present work is the outcome of this paternal injunction. Advisedly, seriously, and thoughtfully can it be now said, these three (3) problems have been answered satisfactorily, and we know that unhealthy alimentation causes primarily all of these classes of disease.

In 1857, the Boylston Prize was awarded the writer for an essay on "Under what Circumstances do the Usual Signs Furnished by

Auscultation and Percussion Prove Fallacious?"

In 1858, the writer invented a laryngoscope, which was made by Alvan Clarke & Son, the great telescope makers.

In 1866, the writer took the first photograph of the vocal cords (his own), which showed the thyroid insertion.

In 1866, he demonstrated to large numbers his own larynx in situ naturali, and the posterior nares, showing either Eustachian tubes at will, the vomer, and turbinated bones, and first demonstrated the erection of the mucous membrane of the turbinated bones in smelling odorous or malodorous substances.

Before 1860, he travelled over five thousand miles to see if alcoholism could be connected with consumption of the lungs.

In 1867, I visited Dr. Salisbury to learn how to study malaria. At that time, I found he had gone one step farther than I, and connected the vinegar plant with consumption. Thus he supplied the missing link to my chain, and, after repeated and careful observations, I came to learn the truth of this new doctrine in the actual treatment and cure of cases, and ever since have endeavored to make it known in proper ways, so far as I could.

Finding Dr. S.'s drawings denounced and ridiculed, and, of course, rejected, and stung to think that this work should be deemed an idle

tale, I set myself to work to photograph as many of the appearances in consumptive blood as I could. Probably this was the first attempt of this kind. Never before this had I known of any blood being photographed save for medico-legal purposes. I found the subject very much hampered with details which I thought should be done away with. Feeling the greatness of the work, and that it should be done before my eyesight and faculties were too old, I gave up a fine country practice and settled in Cambridge, Mass., as I thought this seat of learning would be the most favorable for the encouragement and prosecution of my work. The winter of 1875–6 was spent in working up micro-photography. Fortunately I came across Dr. G. B. Harriman, Surgeon-dentist, of Boston, who possessed magnificent objectives made by R. B. Tolles, among them the 1-50 inch and 1-75 inch. He entered into the work heartily, and together we took micro-photographs of consumptive blood morphology for the first time and with the highest powers ever used up to that time and since (so far as I can ascertain), and which have been pronounced good in Europe.

The account of this work may be found in the *American Journal of Science*, New Haven, August, 1879; *Scientific American Supplement*, September, 1879; *Journal of Micrographie*, Paris, 1879. These photographs have been placed on the screen before the American

Medical Association; Chicago Medical Society; Academy of Medicine, Virginia; Academy of Sciences, New York; Albany Medical College; Monday Lectureship, Boston, Rev. Joseph Cook; Gynecological Society of Boston, and many other bodies. These things are named to show that I am in earnest, for none would have done this unless he was sincere and meant what he said.

In 1876, Professor Paulus F. Reinsch was introduced to me at the Botanical Garden, in Cambridge, as the greatest algologist. Careful study with him has confirmed my views on these so-called Salisbury plans. So many cures have followed, that I feel it would be a crime in me not to testify to what I know, and how I have been set right upon the three tasks propounded by my honored and honorable father more than thirty years ago, and which, so far as in me lies, I have tried to solve or have solved. I am a co-witness with Dr. Salisbury; "that in the mouth of two or three witnesses every word may be established." I charge therefore those to whom these presents may come to look over the evidence, and take time before they treat these things as "idle tales." If the "Imperial Granum" which I have shown morphologically to be common flour, and which the Connecticut agricultural experiment station has also shown to be common flour, selling at $1.00 per pound, while it is worth from

$0.025 to $0.05, is used and indorsed by the medical profession (so that its proprietors have become rich and use fifty-two barrels of flour in one batch), on statements that wilt before the microscope and crucible, does it look well for the same noble profession to treat the plans here indorsed, which stand the tests of the microscope and chemistry, as an "idle tale?"

I have nothing but good feeling or words towards those who honestly differ, but I do dislike to see physicians led by persons who not only have no medical education, but also advertise untruths and at the same time consider these plans as "idle tales," and neglect to look into the evidence which has stood for nearly a quarter of a century, and which affects the weal or woe, not only of the public, but of the profession and the very gentlemen themselves.

Be this as it may, in time to come, none can accuse me of not having tried to discharge the duties which every physician owes to his fellows, to wit: if any physician knows or thinks he knows anything which will better the practice of medicine, there is a moral obligation for him to discharge by making it known, and so long as the rules of courtesy are observed by the contributor, he is entitled to a courteous hearing. Any departure from this savors of savagery and puts the doer at once out of the pale of civilized ethics.

MAY 1ST, 1888.

CONTENTS.

PAGE

Dedication, ... iii.–iv.
Introduction, ... v.–vi.
Preface, ... vii.–xiii.
I. The Morphology of the Blood—Mode of Study, . 1
A. General list of the Morphology of the Blood in Health and Disease, 3; The Colored Corpuscles, 3; The Colorless Corpuscles 4; The Serum, . 4
B. Morphology of the Blood in Health, . . 7
C. Movements and Changes of the Blood in Dying, . 9
D. Morphology of the Blood in Consumption of the Lungs ; Use, 9 ; First or Incubative Stage 10 ; Second Stage, of Transmission, 10; the Third Stage or Stage of Tubercular Deposition 12 ; Fourth Stage, Interstitial Death, . . . 12
E. The Morphology of the Blood in Rheumatism, . 13
F. Fibræmia, ... 17
G. Thrombosis, ... 17
H. Embolism, ... 18
I. Pre-embolic State, ... 18
J. Anæmia, ... 18
K. Pernicious Anæmia, ... 19
L. Morphology of the Blood in Syphilis, . . 19
M. Morphology of the Blood in Eczema, . . 20
N. Morphology of the Blood in Scrofula, . . 21
O. Morphology of the Blood in Malaria, . . 21
P. Hereditary Taints, ... 22
Q. Cancer, ... 23
R. Morphology of the Blood in Variola and Vaccinia, 23
S. Morphology of the Blood in Typhoid Fever, . 23
T. Morphology of the Blood in Scarlet Fever and Diphtheria, ... 24
U. Morphology of the Blood in Fatty Degeneration, . 24
V. Morphology of the Blood in Fibrous Consumption, 25

PAGE

W. Cholesteræmia, ... 25
X. Morphology of the Blood in Carbuncle, . 26
Y. Morphology of the Blood in Yellow Fever, . . 26
Z. Leucocythæmia, ... 26
II. Morphology of the Sputum, ... 27
III. Morphology of the Feces, ... 33
IV. Morphology of the Skin, ... 38
V. Morphology of the Urine, ... 43
VI. Morphology of the Vomitus, ... 48
VII. Morphology of Foods, ... 49
A. Waters of Lakes, Ponds and Water sheds; Hydrant Waters, 49; List, 50; Appendix, . . 54
B. Waters of Springs and Wells unconnected with Lakes or Ponds, ... 58
C. Ice, 63; List, 64; Appendix, ... 65
D. Air, 70; List, ... 72
E. Morphology of Foods; Animal and Vegetable, 74; Vegetable: Uncooked, 74; Cooked, 75; in the Feces, 75, 76, 77. Beefsteak: Uncooked, 76; Cooked, 76; in the Feces, 76; Adulteration, 77; Infants' Foods, ... 78
VIII. Morphology of Clothing, ... 80

EXPLANATORY.

Though, as stated in the title, these partial syllabic lists are after Salisbury, I wish to emphasize that those who read this book should, in order to get more information on the subjects noted, especially the blood, sputum, feces, urine, and skin, consult the works of Dr. Salisbury here named:

1. "The Relation of Alimentation to Disease," octavo, pp. xi., 334, plates 19. New York, 1888: J. H. Vail & Co. (See "Clinical Morphologies," consumption of the lungs, pp. 9 to 13; fibræmia, p. 17; anæmia, p. 18; pernicious anæmia, p. 19; fibrous consumption, p. 25; sputum, pp. 27 to 32; feces, pp. 33 to 37.)

2. "Microscopic Examinations of the Blood and Vegetations Found in Variola, Vaccine, and Typhoid Fever." 66 pages and 62 illustrations. New York, 1868. (See page 23, "Clin. Morphologies.")

3. "Remarks on the Structure, Functions, and Classification of the Parent Gland Cells, with Microscopic Investigations Relative to the Causes of the Several Varieties of Rheumatism and Directions for their Treatment." 1 plate of illustrations. *American Journal Medical Sciences*, October, 1867, p. 19. (See pp. 13, 14, 15, 16, 17, "Clin. Morphologies.")

4. "Vegetations Found in the Blood of Patients Suffering from Erysipelas." Hallier, *Zeitschrift für Parasitenkunde*, 1873, 8 illustrations.

5. "Infusorial Catarrh and Asthma." 18 illustrations, do., 1873.

6. "Description of Two New Algoid Vegetations, One of which Appears to be the Specific Cause of Syphilis, and the Other of Gonorrhœa." Do., 1873. Also *Amer. Jour. Med. Sci.*, 1867. (See pp. 19-20, "Clin. Morphologies.")

7. "Chronic Diarrhœa and its Complications, or the Diseases Arising in Armies from a too Exclusive Use of Amylaceous Food, with Other Interesting Matter Relating to the Diet and Treatment of these Abnormal Conditions, and a New Army Ration Proposed with which this Large Class of Diseases may be Avoided." The Ohio Surgeon-General's Report for 1864.

8. "Probable Source of the Steatozoon Folliculorum." St. Louis *Medical Reporter*, January, 1869.

9. "Something about Cryptogams, Fermentation, and Disease." Do., February, 1879.

10. "Investigations, Chemical and Microscopical, Resulting in what Appears to be the Discovery of a new Function of the Spleen and Mesenteric and Lymphatic Glands." Do., August, 1867, 29 pages.

11. "Discovery of Cholesterin and Serolin as Secretions in Health of the Salivary, Tear, Mammary, and Sudorific Glands; of the Testis and Ovary; of the Kidneys in Hepatic Derangements; of Mucous Membranes when Congested and Inflamed, and the Fluids of Ascites and that of Spina Bifida." *Amer. Jour. Med. Sci.*, April, 1863, 2 plates, 17 pages.

12. "Remarks on Fungi, with an Account of Experiments Showing the Influence of the Fungi of Wheat and Rye Straw on the Human System, and Some Observations which Point to Them as the Probable Source of Camp Measles, and Perhaps of Measles Generally." Do., July, 1862, 1 plate, 30 pages.

13. "Inoculating the Human System with Straw Fungi to Protect It Against the Contagion of Measles, with Some Additional Observations Relating to the Influence of Fungoid Growths in Producing Disease, and in the Fermentation and Putrefaction of Organic Bodies." Do., October, 1862, 8 pages.

14. "Two Interesting Parasitic Diseases; One We Take from Sucking Kittens and the Other from Sucking Puppies. Trichosis Felinus and T. Caninus." *Boston Medical and Surgical Journal*, June 4th, 1868. 6 illustrations. Also *Zeitschrift für Parasitenkunde*, Hallier, Jena, 1875.

15. "Malaria," McNaughton prize essay, 1882. Octavo, pp. 152, plates 10. New York: W. A. Kellogg, 1885. (See pp. 21, 22, "Clin. Morphologies.")

16. "Diphtheria, Its Cause and Treatment." G. A. Davis, Detroit. 3 plates, 1884. (See page 24, "Clin. Morphologies.")

Which are a partial list of his works.

I.

THE MORPHOLOGY OF THE BLOOD.

MODE OF STUDY.

It is necessary to have the patient, the microscope, the light, the means of withdrawal of the blood—a lancet, spring lancet, the scarificator of the writer, or a needle, which is not the best thing—all together.

There is no such thing as taking the blood home to examine. The changes are so rapid that most of the important ones disappear in ten minutes' time. Still, after these are gone, many valuable points remain to be looked for.

Kind of blood.—The capillary—not the venous or arterial.

Site of withdrawal.—On the radial or ulnar side of the forearm near the wrist. The skin should be clean and free from hair. If dirty, wash with soap suds or ammonia water. (It is well that the beginners should study the skin surface, dirt, and epithelium, before looking at the blood.) Take the patient's forearm in the hand, and make the skin tense

in the interval between the thumb and forefinger. A quick puncture is then made, about one-eighth of an inch deep. The tension of the grip will squeeze out a drop of blood. The size of the drop should bear a direct relation to the size of the cover. If there is too little blood, the corpuscles will become crenated, that is, wrinkled from a sort of protoplasmic action induced by too much dryness in the space about the blood. If there is too much blood, the superfluity will float the cover about; there will be too much thickness of the film, and it will crowd the red corpuscles so much as to render them indistinguishable. The excess must be removed by a bibulant. Very much depends on handling the drop of blood rightly. When the drop evenly diffuses itself, it is presumed that the film is about uniform in thickness, so that one can judge somewhat as to the comparative number of corpuscles in each specimen. The process of transferring the blood should take only a few seconds of time; a fraction should be sufficient.

Of course, the slide and cover should be previously cleaned, and also the microscope should be free from dirt and in focus; as, after a previous use, if the blood specimen is placed on the stage, it will be in focus at once, and the rapid movements, changes, and morphological elements will be visible immediately.

The novice had better scrutinize carefully

everything he sees, not caring whether he knows the name of the object or not.

A. GENERAL LIST OF THE MORPHOLOGY OF THE BLOOD IN HEALTH AND DISEASE.

The Color of the Blood to the Unaided Eye. Consistence of the Blood. Rapidity of Clotting.

1. The colored corpuscles.
2. The colorless corpuscles.
3. The serum.

1. *The Colored Corpuscles.*

In normal proportion.

In excess.

In diminished quantity.

Normal consistence.

Too soft, plastic, and sticky; adhering together and being drawn out in thread-like prolongations.

Nummulated, like rolls of coin.

Not nummulated.

Evenly and loosely scattered over the field.

Slightly grouped.

In irregular, compact masses.

In ridges.

Color, clear, fresh, bright, ruddy, clean cut.

Color, pale, muddy, ashy, unlustrous, not fresh, not bright, not ruddy.

Holding firmly the coloring matter, yet soft and plastic.

High colored, smooth and even in outline, hard and rigid.

Allowing the coloring matter to escape freely, obscuring their outlines.

Mammillated.

Cholesterine in.

2. *The Colorless Corpuscles.*

In normal proportion.

In too small quantity.

In excess.

Normal in quantity or in excess; sticky and plastic, endangering the formation of thrombi and emboli.

Ragged and broken down.

In excess, ragged and broken.

In excess, smooth and even.

Containing vacuoles.

Containing vegetations that distend them to an enormous size.

Contain thin, bladder-like, empty cells, of various sizes, that distend them.

Contain the spores of crypta syphilitica.

3. *The Serum.*

Too little.

Too much.

Normal.

Its fibrin:

In normal proportion.

In too small proportion.

In too large proportion.

Meshes normal in size and in arrangement, allowing the free circulation of blood-cells through them.

Meshes too small to admit of the free circulation of blood-cells through them, on account of which the blood-cells arrange themselves in ropy rows, or ridges and masses, being held in the meshes of the partially clotted or contracted fibrin. In such cases, the individual fibrin filaments have an increased diameter and opacity.

Want of, in pernicious anæmia.

Enlarged, thickened, and more opaque in rheumatism.

Thrombi of, filled or not with granular or crystalline matters.

Sticky and plastic.

Minute grains and ragged masses of black, blue, brown, or yellow pigment.

Fat, globules and masses of.

Amyloid matters.

Broken-down parent cells.

Thrombi of algæ spores.

Thrombi of algæ filaments.

Algæ filaments and spores without aggregation.

Fungi spores.

Fungi filaments.

Zymotosis regularis spores.

Zymotosis regularis mycelial filaments.

Entophyticus hæmaticus spores and filaments.

Penicillium quadrifidum spores and mycelial filaments.

Penicillium botrytis infestans.

Crypta syphilitica spores and filaments.

Mycoderma aceti spores and filaments.

Saccharomyces cerevisiæ.

Alcohol and acid yeasts.

Microsporon furfur.

Gemiasma, alba, plumba, rubra.

Mucor malignans.

Biolysis typhoides.

Crypta carbunculata.

Ios variolosa vacciola.

Ios vacciola.

Cryptococcus Xanthogenicus (Freire).

Cystine, granules and crystals.

Phosphates, granules and crystals.

Stelline, granules and crystals.

Stellurine, granules and crystals.

Granules and crystals of a miscellaneous character.

Conchoidine.

Pigmentine, black, brown, bronze, aniline blue, red, yellow, etc.
Cholesterin.
Leucin.
Creatin.
Uric acid and urates.
Carbonate of lime.
Inosite.

B. MORPHOLOGY OF THE BLOOD IN HEALTH.

According to Conventional Nomenclature to Aid in Studies.

Blood from Capillaries:

Color; bright, fresh, clear, ruddy, strong.
Clotting; rapid and firm.

Red corpuscles—arrange themselves in nummulations, or are scattered evenly over the field. Normal in size. Non-adhesive. Central depression well marked on both sides; periphery well rounded, clean cut. Hold coloring matter firmly. Pass readily to and fro through the fibrin filaments. Appear fresh and fair, giving an appearance of health, like a rosy-cheeked maiden full of life.

White corpuscles—normal in size. Not enlarged by internal collections of foreign bodies. Amœboid movements strong or not. Propor-

tion, one to three hundred of red corpuscles. Consistence good. Not sticky. Color a clean white. Freely moving at will.

Serum—clear and free at first sight from any form. After five minutes, most delicate semi-transparent fibrin filaments appear, forming a very light network in the field, which offers no obstacle to the passage of the corpuscles.

There should be no spores nor vegetations in healthy serum, though they may be found by very minute examination, or by letting the blood stand for several days in closely stopped phials at a temperature of from 60–75° Fahrenheit. This is not saying that spores and filaments cannot be found in blood of persons calling themselves healthy—for some diseases exist in a latent condition, like rheumatism, syphilis, cystinæmia, and consumption. I have met with people who, on finding vegetations in their blood, have decided not to accept the evidence because they deemed themselves healthy. Again, it is difficult to find a perfectly healthy person in the community; this was made public during the "late unpleasantness," when drafts were made for soldiers. The blood evidence must be taken in connection with that of the other physical signs.

C. MOVEMENTS AND CHANGES OF THE BLOOD IN DYING.

These are important and need study. They are like the behavior and manners of people that convey ideas, as they are to be gained in no other way. After one has learnt these movements in health, he will appreciate them in disease. Again, as Dr. Salisbury remarks, there are tendencies to diseased states in the blood which need detection, as they are much easier remedied than when confirmed. It is impossible to convey these ideas on paper or in drawings; they must be learned from actual observation. *The morphology of healthy blood is a most rigid test, and in delicacy and far reaching goes beyond any of the other physical signs.* When generally known and appreciated, it will be of great benefit, specially in life insurance examinations, army or navy examinations, and in the study of the best modes of physical culture.

D. MORPHOLOGY OF THE BLOOD IN CONSUMPTION OF THE LUNGS.

Use.—In diagnosis, exceeding in value auscultation and percussion, because it detects consumption of the lungs before there is any lesion of them. To show the real progress of the case by the substitution of the morphology

of health more or less, to show when patients have lapsed in the treatment by eating forbidden food, and to show when there is a real cure. To repeat, most valuable of all to make out a diagnosis of consumption with as much certainty as it is possible in human affairs, and by removing the uncertainty, sometimes dreadful, of the diagnosis that accompanies the conventional first stages of consumption of the lungs.

This value is so great that it is more than a warrant for this publication to be made. It is hardly possible to overestimate the importance of this department of physical exploration.

First or Incubative Stage.

Red blood-corpuscles are less in number, ropy, and sticky, more or less, but not much changed otherwise.

Second Stage, of Transmission.

1. *Red corpuscles.*—Color pale, non-lustrous; not clear cut, not ruddy. Consistence, sticky, adhesive. Coating of neurine removed. Not so numerous as in normal blood. Owing to the increased size and strength of the fibrin and the stickiness, they form in ridges, rows, but not so marked as in rheumatic blood. They accumulate in aggregations of confused

masses, like droves of frightened sheep. They adhere to each other, and are rotten, as it were, in texture.

2. *White corpuscles.*—Enlarged and distended by the mycoderma aceti, or spores of vinegar yeast, that are transmitted into the blood stream from the intestines.

3. *Serum.*—More or less filled with the spores of mycoderma aceti or vinegar yeast. These occur either singly or in masses of spores, which is the common form in which they are found, wherever vinegar is produced.

The fibrin filaments are larger, stronger, more massive than in health, and form under the microscope a thick network which is larger, stronger, and more marked in direct proportion to the severity of the disease or the amount of accumulation.

Besides, the serum is apt to be of a dirty ash color.

The sticky white corpuscles, the massive fibrin filaments in skeins, and the yeast spores alone or combined, form aggregations, masses, collects, thrombi and emboli which block up the blood-vessels of the lungs soonest, because exposed to cold air, the most of any viscus; *the blood-vessels contract, and thus arrest the thrombi and form a heterologous deposit, which is called tubercle.*

The Third Stage, or Stage of Tubercular Deposit.

These deposits increase so long as vitality subsists in the tubercle and surroundings. When vitality ceases, the tubercle softens or breaks down. Sometimes, if the process is very slow and life slightly inheres in it, the proximate tissue undergoes fatty infiltration, which preserves it from readily breaking down.

The morphology of the blood is the same for the second and third stages of consumption.

Fourth Stage.

Interstitial Death.

Morphology of the blood in this stage is the same as in the second and third, save that it becomes more impoverished.

The red corpuscles are thinner, paler, much lessened in number, increased in adhesiveness, stickiness, and poverty. Devoid more or less of neurine.

The white corpuscles are fewer in number, more enlarged; often ragged and rough. Distended with spores of mycoderma aceti, more adhesive, and sticky.

The serum.—Fibrin filaments are thickened, stronger, more massive, and more skeins of them present. The collects of mycoderma

aceti are very much larger and more numerous; in moribund cases, I have seen them so large as almost to fill the field of the microscope. They present anfractuous edges and amœboid prolongations, giving them a weird, bizarre aspect which, under the circumstances, have a portentous aspect, for the larger and more numerous the spore collects of mycodermi aceti are, the more dangerous the case.

One great proof of the so-called Salisbury plans is, that they will entirely change the morphology of consumptive blood to that of health, and the whole process can be watched and studied to the delight of all concerned.

E. MORPHOLOGY OF THE BLOOD IN RHEUMATISM.

Rheumatism may be called the

Gravel of the Blood.

Color varies from that of health to the paleness of anæmia.

Consistency and *rapidity* of *clotting* increased.

1. *Red corpuscles.*—Color usually impaired, not always; coloring matter not so firmly held as in health.

Adhesive, sticky, often drawn out into elongated lozenge-shaped bodies with pointed ends, and sometimes filamentous joining with one or more of their fellows.

Clot in winrows, ridges, and huddled masses; sometimes quite formless. This is caused by the massive fibrin filaments holding them fast, as it were, in their firm meshes. The same thing is seen in consumptive blood, but to a less degree.

2. *White corpuscles* usually enlarged; adhesive, sticking to each other and to the red corpuscles, and matters found in the serum. Indeed, it seems to be the office of the white corpuscles so far as possible to swallow and envelop any foreign substance that may find its way into the blood. Thus we find crystalline matters in the white blood-corpuscles in rheumatism, though not always.

They undergo amœboid movements as in healthy blood—they have independent locomotion. Disease does not seem to impair their automatic movements.

Often they are increased in number. If there is fatty degeneration going on, they will be found to contain fat in globules.

3. *The serum.*

Fibrin filaments—in massive, strong and sticky threads, in abundance—in meshes, which are finer than in health, visible plainly—strong and hold the red corpuscles like prisoners—in skeins, like tangled skeins of silk—in masses forming thrombi which, when fastened, form emboli.

These thrombi are apt to involve and em-

brace white and red corpuscles and crystalline bodies to be named below. Sometimes the fibrin filaments are found in large round strings, curled up fancifully by the motion of the blood stream, and looking like the mycelial filaments of vegetations, from which they can be distinguished by an absence of entire cylindrical outline—ragged broken edges here and there and dichotomous and polychotomous divisions of the trunk, different from vegetations of syphilis for example. It is the presence of these fibrin filaments that makes the blood ropy, adhesive, and sticky. They have the tendency to block up the blood stream and besides to be locally deposited in the tissues, specially when the circulation is sluggish, as near the extremities and the joints.

Crystalline bodies, or gravel of the blood.

These are numerous and readily recognized; some of them are as follows:—

1. Uric acid and urates of soda.
2. Phosphates—specially the triple phosphates of lime and soda.
3. Oxalate of lime.
4. Cystine. This is quite common and easily detected.
5. Carbonate of lime, rare.
6. Stelline and stellurine. These occur mostly in granular form in the serum, but in

old cases, where the system is saturated, they are crystalline.

7. Black, brown, aniline blue, bronze, orange, red and yellow pigments in the form of flakes or small masses are common in rheumatic blood, and may be termed gravelly matters that should have been eliminated by the kidneys or bowels or skin.

Latent Condition of the Characteristics of Rheumatic Blood.

The morphology of rheumatic blood exists in a latent condition in persons apparently well; but when they are exposed to cold, the blood-vessels contract, catch and detain these abnormal elements, and we have a stasis of the blood which may be active or passive and manifests itself in heat, fever, pain, swelling, inflammation or passive congestion, effusion, etc., and which make up what is known as an "attack of rheumatism." The fever may result from the effects of nature to get rid of the intruders, just as a householder will become hot in expelling from his premises a thief who is difficult to get rid of. Or to use another simile, the attack of rheumatism is like the explosion of a gun. The charge in the gun is the morphology of rheumatic blood, and the cold is the pulling of the trigger. The charge may be latent in the gun for years, but it is

there with its potential energy ready to become actual from an exciting cause.

F. FIBRÆMIA.

In a nomenclature which was made before the present advance of knowledge, there is difficulty in making it fit to the new era. I shall not attempt to relieve this difficulty, but try to adapt the subject to the conventional names, as the object of this work is practical aid in treating diseases, no matter what they are called.

Fibræmia is where the fibrin is in excess in filaments, skeins, curled massive fibres like strings—thrombi and emboli. These are in a more exaggerated condition and form than in consumption or rheumatism, and are not necessarily associated with the crystalline matters or gravel. Sometimes the fibres look like a scalp that has been taken from the head of a woman with long tresses of hair.

G. THROMBOSIS

Is where masses of fibrin accrete and consolidate together, including or not the red corpuscles, white corpuscles, crystalline and pigmentary bodies, spores and mycelial filaments or vegetations, one or all.

H. EMBOLISM

Is where a thrombus has been caught or engaged in a blood-vessel and acts as a plug disturbing the circulation. When the embolus is made up of spores of mycoderma aceti or vinegar yeast and is caught in the lungs, it develops tubercle of the lungs, and so in other parts of the body. So senile gangrene of the extremities is caused by fibrinous clots plugging up an artery.

I. PRE-EMBOLIC STATE.

As thrombi precede emboli, so they can be detected in the blood before the embolism, simply by the morphology of the blood. In this way, sudden deaths from embolism, specially in the puerperal state, can be averted, and this aid alone renders the microscope an invaluable assistant to the physician who is devoted to his profession, and is sufficient to redeem it from the title of "accursed," as given it lately by a divine of this city.

J. ANÆMIA

Is where the serum is in excess and the red and white corpuscles are in diminution; fibrin also in excess.

K. PERNICIOUS ANÆMIA

Is where the red corpuscles are not formed or normally replaced. Here the blood glands are at fault, from improper alimentation. It is essentially a food disease.

L. MORPHOLOGY OF THE BLOOD IN SYPHILIS.

This morphology can be found associated with any of the preceding morphologies, but, when present by itself, it is recognized in the

Serum in two forms.

First. The spores of the crypta syphilitica.

Second. The mycelial filaments or full development of the same. The fructification is yet to be seen.

1. *The spores* are very minute, automobile, very lively, active, and saltatory. Carefully focussed a little off, they show a copper color. They dance about in the serum spaces and over the red corpuscles, where they elude search, unless one is a good and careful observer. They also crowd or are crowded into the white corpuscles, in which their color appears to greater distinctness, and which corpuscles are often distended to a great size.

2. *The mycelial filaments* of the crypta syphilitica are round, cylindrical, slightly tapering, mostly in small curved pieces broken off, with

one end larger than the other, or clavate at one end.

Color, when a little out of focus, copper. Sometimes they are long and wavy, sometimes branching. They are found in best condition in the walls of chancres.

The great value of a diagnosis of the morphology of syphilitic blood lies in the almost instant detection of the disease without a word to the patient, and in telling at once when the disease is cured, for it is not cured unless the blood is free from the plant.

The use of this morphology would prevent the terrible lesions of tertiary syphilis, as the patient would not be allowed to run into this stage. It tells at once the real progress of the case under treatment, and shows how remedies act, or if they are good for anything. It amazes the writer to see how indifferent the profession are to the morphology of syphilitic blood. It is an "idle tale," just as ocean steam navigation, telephony, and railroading were. Ere I die, I hope to see the world enjoying the benefit of this use of the microscope, as it does the once "idle tales" named.

M. MORPHOLOGY OF THE BLOOD IN ECZEMA.

Here the spores are black and still, not automobile, but passive. Parent vegetation not made out. This morphology may be found

associated with any of the others. No case of eczema is cured unless these spores are eliminated.

N. MORPHOLOGY OF THE BLOOD IN SCROFULA.

This is either syphilitic or tuberculous, or both. See the morphologies of consumption and syphilis.

O. MORPHOLOGY OF THE BLOOD IN MALARIA.

Here the diagnosis rests on the forms found in the serum. There are:

1. *The spores* of the gemiasma plants or other plants found in malarious districts, which rise in the air from the soil, and are inhaled into the air passages where the blood comes within one-three-thousandth ($\frac{1}{3000}$) of an inch of the atmosphere. They there gain admission to the blood.

2. *The sporangias* of the mature gemiasmas. These are pale or white in color, and generally contain less spores than normal, as would be expected in algæ growing in an unnatural habitat, as the inside of the human body.

Remarks.—1. Are most common. 2. Are rare, but in doubtful cases, if the skin morphology of the axillæ is studied, the full-grown aerial form of the gemiasmas may be found there for corroborative diagnosis. The malaria

blood morphology may exist in a latent condition in persons apparently healthy, needing a torpid liver or a cold to make their energy actual, just as in the case of the loaded gun alluded to above.

There are several kinds of cryptogamic vegetations that cause malaria. Some of these are innocent vegetations in their natural habitat, but when animalized by coming in contact with animal matter in decay, and living on it, then they are endowed with a power to attack and live on the human habitat, and become the predisposing cause of malaria—so termed probably because these causative vegetations invade through the air—when taken into the digestive organs, as they must be in quantities, they seem to be destroyed by the juices of the alimentary canal. See "Malaria," McNaughton prize essay, 1882, by J. H. Salisbury, M.D., LL.D. New York: W. A. Kellogg, 1885.

P. HEREDITARY TAINTS

Are conventionally supposed to come through the blood, but the evidence of blood morphologies does not bear out this idea in a general way. Consumption comes by feeding on food that undergoes alcoholic and vinegary fermentation in the digestive organs.

The spores of crypta syphilitica and eczema may be transmitted from the mother or father

to the offspring, but they are now about the only ones that can be traced.

Q. CANCER

Is more a disease of nutrition—tissue developed under mob law—and goes in families, because families feed on the same food at the same table. The researches of Dr. Domingos Freire, of Rio Janeiro, and others point out a microbe. This is an advance in our knowledge, for hitherto we have been able to detect no vegetation in cancerous blood before the general system has been broken down in the last stages, and here it seems more a result than a cause. But we are grateful for any more light, and accord Dr. Freire all credit and honor for his work.

R. MORPHOLOGY OF THE BLOOD OF VARIOLA AND VACCINIA.

Ios variolosa vacciola spores and filaments in variola.

Ios vacciola spores and filaments in vaccinia.

S. MORPHOLOGY OF THE BLOOD IN TYPHOID FEVER.

Biolysis typhoides spores and filaments.

The spores grow with great profusion in the

white blood-corpuscles, leaving them as empty sacs sometimes floating in the blood stream. The spores also grow in profusion in all the epithelia of the body. Patient not cured before the plant is removed.

T. MORPHOLOGY OF THE BLOOD IN SCARLET FEVER AND DIPHTHERIA.

Scarlet fever.—Mucor malignans spores, or a species very near kin to it.

Diphtheria.—Mucor malignans.

The aerial form may be cultivated from the throat membranes, but it is very dangerous work. The writer found that a three and a half years' sojourn of the diphtheritic membrane (from the uvula of his daughter Mary who died in spite of all that was done) in strongest carbolic acid was not enough to destroy the life of the vegetation. He confesses he was frightened, and abandoned the study of this particular spore.

U. MORPHOLOGY OF BLOOD IN FATTY DEGENERATION.

The white corpuscles contain globules of fat more or less abundant. The serum in advanced cases, or cases tending that way, contains fat globules more or less large and numerous.

The red corpuscles are apt to have not full

color, strength of outline, and be adhesive, pale, sticky.

Remarks.—The fibre of an outlying muscle may be brought out by a minute spear thrust in and tested for fat in the fibrillæ (S.), as a confirmation of the diagnosis. Very important in the treatment of softening of the brain, apoplexy, Bright's disease, etc.

V. THE MORPHOLOGY OF THE BLOOD IN FIBROUS CONSUMPTION.

Here the mycoderma aceti or vinegar yeast does not get into the blood, and change it, as in tubercular consumption, since the pylorus keeps the vinegar yeast in the stomach. There is breaking down of living tissue to a less extent. This tissue has been thickened, hardened, and made stony from deposit of gravel. The diagnosis is not so easy as that of tubercular consumption.

W. CHOLESTERÆMIA.

Red blood-discs soft, yielding, plastic, often sticky, holding feebly the coloring matter which escapes and obscures the field.

Serum contains cholesterin.

Diagnosis.—Blood standing a few hours on the slide; crystals of cholesterin appear on the edges of the slide.

This shows a tendency to amyloid disease in the spleen, lacteal and lymphatic glands, liver, kidneys, heart and large blood-vessels, and *amyloid matters are found in the blood stream.*

X. MORPHOLOGY OF THE BLOOD IN CARBUNCLES.

Crypta carbunculata spores and filaments which are found in abundance also in the sloughs of the carbuncle.

Y. THE MORPHOLOGY OF THE BLOOD IN YELLOW FEVER.

Cryptococcus xanthogenicus (Freire). See his monumental work.

Z. LEUCOCYTHÆMIA

Is where the white corpuscles are in large excess and the red corpùscles in diminution; serum in excess.

II.

MORPHOLOGY OF SPUTUM.

MODE OF STUDY.

One and one-fifth inch objective; one inch ocular.

Polarized light needed sometimes to distinguish the fibres of lung tissues from other organic fibres.

At least three specimens should be collected and studied at each examination. Sputum may be sent from patients prepared as follows: dry, away from sun or stove, a mass of morning sputum about one inch in diameter on white writing paper. The specimen will keep indefinitely and may be mailed anywhere. When ready for examination, soak specimen with a little water. The objectives made by the late Mr. Tolles and by his successor, Mr. John Green, will focus through a slide. It is therefore much easier to place some of the moistened sputum on a slide and then cover with another slide; this is done quicker than when one has to use thin covers. It is a pity that other American objective makers cannot follow the example of

the illustrious Tolles, and make one-fifth inch objectives that will focus an eighth of an inch from the object, and not a sixteenth or thirty-second, as the common rule is.

Sputum needs morphological study as much as urine or blood.

As the morphology may include that of the air, of course this is incomplete.

Aerial forms of yeasts.

Albuminoid matters.

Alcoholic and lactic acid yeasts.

Algæ, names unknown.

Amorphous organic and inorganic matters, including dust and dirt inhaled from the atmosphere.

Amyloid bodies.

Anabaina irregularis.

Any of the microscopic fauna and flora found in drinking waters.

Asthmatos ciliaris.

Bacilli.

Bacteria, so-called.

Blood-corpuscles, white and red.

Butter.

Calculi made up of:

- Cholesterin.
- Cystin.
- Oxalate of lime.
- Phosphate of lime.
- Triple phosphates.
- Uric acid.

These may all come under the appellation of "gravel of the lungs."

Carbon, from smoke inhaled.

Carbonized tissue from lungs.

Cells and fibres of lung tissue.

Cholesterin.

Clots of blood.

Colloid.

Connective animal tissues.

Contents of giant cells escaped outside of walls.

Cotton fibre.

Cream of tartar crystals.

Crystals with two or more terminals.

Cystin.

Dust and dirt.

Elastic lung fibres.

Elements of animal food eaten, cooked and uncooked.

Elements of vegetable food eaten, cooked and uncooked.

Epithelia, ciliate, non-ciliate, pavement, columnar.

Fat.

Feathers.

Foreign substances inhaled.

Fucidium.

Fusiform crystals.

Gemiasma alba.

Gemiasma rubra.

Gemiasma verdans.

Granular tubercular masses.

Granular tuberculous matter, so-called, sometimes fetid in odor.

Gravel, crystalline.

Gravel, granular.

Gravel, massive.

Hairs of plants and animals.

Inelastic lung fibres.

Ipecac dust.

Lactic acid alcoholic yeast.

Lactic acid mother of vinegar.

Lactic acid vinegar yeast.

Leptothrix buccalis spores and filaments.

Leptothrix buccalis heavily loading and enormously distending lingual papillæ with spores and filaments.

Leptothrix buccalis in epithelia.

Linen fibre.

Lumina of blood-vessels.

Micrococcus spores.

Microsporon furfur.

Mucor malignans (diphtheria).

Mucous cells swarming with the moving spores, probably of the leptothrix buccalis; not found in the mouths of healthy infants.

Mucous corpuscles.

Mucous corpuscles, caudate and deformed.

Mucous corpuscles distended with albuminoids.

Mucous corpuscles distended with crystalline and other bodies.

Mucous corpuscles distended witn cystin or giant cells.

Mucous corpuscles distended with leptothrix.

Mucous corpuscles distended with melanotic matters.

Mucous corpuscles distended with oxalate of lime.

Mucous corpuscles distended with triple phosphates.

Mucous corpuscles distended with uric acid and urates.

Mucous corpuscles, normal.

Mucous filaments and fibres.

Mucus; normal and ropy and viscid (colloid).

Muscular fibres of food.

Mycelial filaments of acetic acid vinegar, and lactic acid vinegar yeasts.

Mycelial filament of fully developed yeasts and other fungi.

Mycoderma aceti, spores and filaments.

Other crystals whose names have not been made out.

Oxalate of lime.

Papillæ of tongue, usually infiltrated with spores of leptothrix.

Partially carbonized vegetable tissues from smoke.

Phosphate of lime.

Pigment matters.

Pitted ducts, etc.

Portions of feathers of animals and insects.

Potato starch.
Pus-corpuscles.
Sarcina.
Silk fibre.
Skeins of mycelial filaments.
Special pollens.
Spirilina splendens (asthma), Salisbury, 1865.
Spirillum.
Spores of artemisia absinthium.
Starch, corn.
Starch, potato.
Starch, wheat.
Swarms of spores.
The whole lumen of a vein just before ending in the capillary.
Tough, ropy mucus.
Triple phosphates.
Tubercles.
Uric acid and urates.
Uric acid crystals.
Vegetable tissues.
Vegetations found in croupal membranes (Cutter, 1879).
Vibriones.
Vinegar yeast.
Vinegar yeast and lactic acid vinegar yeast.
Wheat starch.
Woody fibres.
Yeast plants.
Yeast sporangia, alcoholic and lactic acid.

III.

MORPHOLOGY OF FECES.

SHOWS THE CONDITION OF DIGESTION, GOOD, BAD, OR INDIFFERENT, AND SOME PATHOLOGICAL STATES.

MODE OF STUDY.

Prepare specimens for mailing, in the same way as sputum. A good microscope, one inch, one-fifth inch objectives, one inch ocular, polarized light.

Moisten specimen, and place on slide, and (if the physician has a fifth-inch objective that will focus through a common slide) cover specimen with a piece of slide. This is quicker, easier, cleaner, and more effective than with thin covers.

Acetic acid yeasts.

Alcohol.

Another species of sarcina.

Bacteria.

Beard of wheat.

Beef-red pieces of thickened mucus.

Black pigment from glands of Lieberkuhn and Brunner.

Blood.

Butyric acid yeasts.

Carbonate of lime.

Casts of intestinal glands.

Cholesterin.

Colloid.

Colloid matters, resembling ovarian, thyroid, and mammary tumors and those of testes.

Cotton fibre.

Cream-colored pus.

Crystals of phosphates, cystin, urates, oxalates, etc., colored with melanotic matters.

Crystals of sugar.

Crystals of triple phosphates.

Crystals of cystin.

Crystals, urates, uric acid, etc.

Different vegetable fibres.

Eggs of ascarides.

Eggs of different worms.

Eggs of tænia.

Eggs of trichocephalus dispar.

Epithelium.

Fat with acicular crystals.

Fat globules.

Gelatinous mucus.

Gluten.

Granular, amorphous, homogeneous matter, normal feces, with triple phosphates.

Healthy feces are homogeneous, formless, like a solid extract.

Homogeneous fecal matter.

Lactic acid yeasts.

Linen fibre.

Microcystis and plants allied to them, unnamed.

Mucous corpuscles.

Muscular fibre.

Mycoderma aceti.

Oil globules.

Oils.

Oxalate of lime.

Partially cooked and burnt muscular fibres.

Penicillium.

Pigmentine, black, etc.

Remains of animal tissues:

Connective tissue.

Striated fibres: striæ non-, partially or wholly effaced by digestion, etc., etc.

Remains of vegetable tissues:

Apples:—Clear, almost transparent sacs of thin cellulose.

Baked beans:—Sacs of thick cellulose containing starch cells; when un- or partially cooked, they are globular, pyriform, elongated, compressed, apparently triangular, sometimes reminding of difflugia cratera, sometimes of pelomyxæ, and so on; the transparent envelope of cellulose looks like the clear margin of gemiasma verdans, rubra, and plumba found in malaria. The thickness of this coat is about one-seventeenth of the diameter of the sac.

The starch cells polarize light or not as they

are uncooked or cooked. The cellulose envelope of the entire bean is made up of layers of crystal-like shapes, which are set in rows, their internal and external faces appearing very much like the tops of the Giant's Causeway crystals of traprock. These crystal-like elements of cellulose, when un- or partially cooked, are but slightly hourglass-shaped, but, when thoroughly cooked, appear like double-headed tacks.

Epithelial cells and areolar tissue of beans may also be present.

Bananas:—Clustered masses of starch grains.

Cranberries:—Pigment cells of skins.

Greens:—Spiral ducts in bundles, etc.

Potatoes:—Cork cells, starch cells, areolar tissue. Gubernaculum tissues that lead from the eyes to the centre. The starch bundles or the starch in homogeneous masses, the pitted ducts, the vascular bundles, etc.

Wheat: beard, outer coats, gluten cells, areolar tissue, etc., etc.

This is only a very partial list of vegetable tissues. I have only indicated a few elements in order to show how to go at the study, for my own work has led me to distinguish many more forms.

Saccharomyces cerevisiæ.

Sarcina ventriculi.

Seroline.

Several species of minute algæ.

Shreds of coagulated mucus.

Sirocoleum.

Strings of thin folded laminæ of coagulated mucus.

Strips of tissues, scourings.

Sugar.

Sulphuretted hydrogen vegetations.

Tarry condition from bile which should have been carried out by urinary organs and sweat glands (Salisbury).

Tegument of wheat, cigar coat.

Tough ropy mucus (colloid).

Triple phosphates.

Tubercles.

Urates.

Vegetations of putrefactive decomposition.

Vinegar.

White coagulated mucus, like folded tissue paper.

White connective fibrous tissues.

Yeast plants.

Yeasts:

- Acetic acid.
- Alcoholic.
- Butyric acid.
- Lactic acid.

IV.

MORPHOLOGY OF THE SKIN.

MODE OF STUDY.

Simply moisten the skin with distilled water and rub in with a clean knife blade. Then scrape off and place under microscope; use one-fifth inch or one-tenth inch objectives or higher as needed, having water enough to make a thin clear field; in studying dirt and some of the grosser forms, use lower powers.

Acarus autumnalis.

Acarus folliculorum, steatozoon folliculorum.

Acarus scabeii.

Acne.

Adenoid.

Ague plants. Among these gemiasma alba, gemiasma plumba, gemiasma rubra.

Anabaina subtularia.

Animal hairs.

Anthrax vegetations.

Asthmatos ciliaris.

Bacteria.

Blood, free and dried.

Blue, purple, black pigments.

Boils, vegetation of.

Bots.
Cancer.
Carbonate of lime.
Carbuncle, anthrax.
Carpet fibres.
Chloasma.
Cholesterin.
Cimex lectularius.
Crypta syphilitica (Salisbury) spores and filaments.
Cystin.
Dermatophyton.
Dirt.
Drugs, ipecac, etc.
Eczema spores.
Eggs and larvæ of insects.
Eggs of tape-worm.
Epithelia, normal.
Epithelia, lactic acid yeast in.
Epithelia, vinegar yeast in.
Epithelia with biolysis typhoides.
Epithelioma.
Erysipelas vegetations.
Fat.
Fatty degeneration.
Fatty infiltration of muscles.
Favus, tinea favosa.
Feathers.
Fibres of textile products, cotton, linen, wool.
Fibroid tissues.
Filaria medinensis.

Floor fibres.

Flour and flour vegetation, as on baker's wrists.

Fungi.

Fungoid spores and mycelia of unnamed plants.

Germs in epithelial and mucous tissues, glands and follicles of eye and other organs.

Gravel, foreign and native.

Hairs and vegetations.

Jiggers.

Jute.

Keloid.

Kerion.

Lard.

Leather.

Leprosy spores.

Lice.

Malignant pustule vegetations.

Measles vegetations.

Mentagrophyton.

Microsporon Audouini.

Microsporon furfur.

Mosquitoes, parts of.

Mucor malignans of scarlet fever and diphtheria.

Mucus.

Mycetoma, Chionyphe Carteri.

Mycoderma aceti spores and filaments.

Nails, vegetations and dirt under.

Oils.

Onychomycosis, onychia parasitica.
Oxide of lime.
Paint lead salts.
Pediculus capitis.
Pediculus corporis vel vestimenti.
Pediculus pubis.
Phosphates of lime.
Pigment matters.
Plant hairs.
Poisonous plant products.
Pollen of plants.
Porrigo scutulata or tinea tonsurans.
Protococcus monetarius under ends of finger nails.
Pulex or sarcopsylla penetrans, Chigoe.
Pus.
Pus decomposing into fat.
Saccharomyces cerevisiæ.
Salt, chloride of sodium.
Scald head.
Scarlet fever vegetations, mucor malignans.
Scars of pregnancy and fat distention.
Seborrhœa.
Secretions of hair and sweat glands.
Serum.
Silica.
Silk.
Small-pox vegetations.
Soap.
Spermatozoa.
Stains of silver, etc.

Starch grains of all kinds.
Steatozoon folliculorum.
Stellin.
Stellurin.
Sulphate of lime.
Sweat.
Syphilodermata.

The objects found in the *morphology of the air* are to be expected in the morphology of the skin.

Tinea circinata, trichophyton tonsurans.
Tinea decalvans, microsporon Audouini.
Tinea favosa, achorion Schonleinii.
Tinea kerion.
Tinea sycosis, microsporon mentagraphytes.
Tinea tarsi, tricophyton.
Tinea tonsurans, tricophyton.
Tinea versicolor, microsporon furfur.
Trichosis caninus (Salisbury).
Trichosis felinus (Salisbury).
Triple phosphates.
Uric acid.
Vaccinia vegetations.
Variola vegetations.
Vegetations from water used in washing.
Vegetations of animal poisons.
Vibriones.
Woody fibre.
Yeasts growing in epithelia of skin.
Zinc, oxide of.

V.

MORPHOLOGY OF THE URINE.

It is good to use an inch objective as well as a fifth (1-5) inch objective in studying the morphology of the urine. The one-inch objective at once brings out the casts of kidney tubes, prostate gland ducts, spermatic ducts, besides the colloid matters that otherwise elude search and are, in my opinion, very important clinically.

Urinoscopy is more valuable than the pulse in telling the status of the liver, stomach, kidneys, urinary organs, and general systemic condition. It should be used daily. The urine voided on rising in the morning is the best to examine. *The chemical examination of the urine should go side by side with the morphology; neither supersedes the other.*

The aim should be to make each patient's urine come up to the standard of the urine of a healthy infant, nursing a healthy mother's breast. *This urine is clear, odorless, and free from deposit.* The cures in the so-called Salisbury plans include an aiming at a conformity to this standard. It is a mistake for each

physician not to make his own examinations of urine almost daily. The urine is very sensitive to bad feeding and overdoing in any way, and shows them almost as plainly as if it said "bad feeding and overdoing" in so many words. Lastly, many physicians will not examine urine chemically or microscopically, as such examinations appear to be too difficult, though these men may be masters in the practice of medicine; there is nothing in the present knowledge of the urine that any one of moderate ability may not and should not master, for, to repeat, the urine is a source of valuable clinical information.

Accidental foreign bodies.

Acicular crystals, same as found in ague soils.

Ague plants, mostly in embryonic forms, sometimes mature.

Amorphous urates.

Amyloid matter, common.

Anabaina irregularis.

Arachnida.

Asthmatos ciliaris (rare).

Bacilli.

Bacteria.

Blood, red corpuscles.

Blood, white corpuscles.

Calculi of urates and phosphates from pelves of kidneys or not.

Cancer cells must not be mistaken for giant cells with prolongations sometimes ten times

their length, and sometimes connecting with gubernacula two or more giant mucous cells.

Carbonate of lime.

Casts of spermatic ducts, clear or with amyloid, phosphate of lime, triple phosphates, etc.

Catarrhal discharges from spermatic ducts or the prostatic glands:

(1) Protoplasmic.
(2) In skeins.
(3) In Indian clubs.

These occur together at times; a supposed cause of neurasthenia in men (Cutter).

Chyme.

Colloid matter.

Cotton, wool, bast, linen fibres, indeed any form from the morphology of the air may get in accidentally.

Crypta syphilitica spores.

Cryptococcus xanthogenicus.

Crystals with radiations formed within cells with amœboid projections.

Cystin.

Dirt.

Dust.

Eggs of ascarides.

Eggs of trichocephalus dispar.

Epithelia invaded by vegetations of scarlet fever, diphtheria, typhoid fever, etc., etc.

Epithelia, pavement and columnar, from bladder and vagina.

Fat in globules.

Fatty casts of kidney tubes.

Fatty epithelia from kidneys.

Fragments of animal and vegetable tissues.

Giant cells distorted and connected together by gubernacula—parent mucous cells, probably simulating cancer cells.

Gemiasma rubra.

Gravel.

Hyaline casts of kidney tubes.

In perfect health, free from deposit or odor, like healthy nursing infant's urine.

Lactic acid yeasts, spores and filaments.

Mucous cells.

Mucous fibres and casts from kidneys.

Mucous filaments.

Mycelial filaments of mycoderma aceti—sometimes mother of vinegar.

Other algæ.

Oxalate of lime, granular and in dumb-bell.

Penicillium.

Phosphates.

Phosphate of lime.

Pigment matters.

Pus cells.

Putrefactive yeasts in spores and mycelial filaments. When these are voided from the bladder, in spores single or aggregated, filaments single or in skeins, I regard it as a diseased condition, to be treated as such. Have known epilepsy to be caused by them, and cured by their removal (Cutter).

Radiating plants, same as found in ague soils.
Saccharomyces cerevisiæ, or alcohol yeasts.
Spermatozoa, normal.
    With two heads.
    With three heads.
    With two tails.
    With three tails, etc.
    With two heads and two tails.
    With three heads and three tails, etc.
Sphærotheca spores and filaments.
Starch grains.
Triple phosphates.
Urates of soda and ammonium.
Uric acid.
Vegetations of gonorrhœa.
Vibriones.
Waxy casts of kidney tubes.
Yeasts.
Zoogloœa forms.

VI.

THE MORPHOLOGY OF THE VOMITUS.

Any object of the morphology of foods.
Bile.
Blood.
Butyric acid fermentative vegetations.
Cancerous matters.
Chyme.
Coagulated food.
Colloid.
Cryptococcus xanthogenicus.
Epithelia.
Food partly digested.
Lactic acid yeasts.
Morphology of feces, rare.
Mucous corpuscles.
Mucus.
Mycoderma aceti.
Saccharomyces cerevisiæ.
Sarcina ventriculi.
Slime.

Sometimes yeast plants form a coating on œsophagus, discharged as a membrane.

VII.

MORPHOLOGY OF FOODS.

A. WATERS OF LAKES, PONDS, AND WATER SHEDS; HYDRANT WATERS. *

Morphology of animals, plants and other substances found in hydrant waters and pond waters, such as are used for drinking purposes.

The list is very incomplete, as more than half of the objects found have no names (Professor Paulus F. Reinsch, Erlangen, Ger.).

Over thirty hydrant waters of cities and towns were studied. Among these were those of Albany, Brooklyn and New York, New York; Arlington, Boston, Cambridge, Charlestown, Haverhill, Charles River, Jamaica Pond Boston, Lynn, Malden, Salem, Springfield, Winchester, Woburn, Worcester, Wellesley Hotel, Massachusetts; Philadelphia, Penn.; Hartford and New Haven, Connecticut; Chicago, Illinois; Washington, D. C.; Dover, New Hampshire; Baltimore, Maryland; Cleveland, Ohio; Richmond, Va. Besides ponds in Amherst, Falmouth, Natick, Holbrook, Wake-

* See page 81 for mode of examination.

field, West Falmouth, Wellesley, Massachusetts; East Greenwich, Rhode Island, and North Turner, Maine.

LIST.

A beautiful entomostraca, like the branchippus stagnalis. (Croton.)

A delicate animal which looks like a snail, and yet without the terminal of the spiral. It is beautifully transparent, so that the motion of the heart is more apparent than in the following. (Croton.)

A magnificent animal composed of a hyaline sac open at one end. Transparent. Mouth provided with cilia, which are inverted completely within the body at will. The viscera are held together by gubernacula just outlined enough to be visible. These contract, and keep the viscera moving to and from the mouth; specimen name unknown to me; have found it only in the Croton.

Abundant mycelial fungus filaments.
Acineta tuberosa.
Acropherus.
Actinosphericum Eichornii.
Actinodiscus.
Actinophrys sol.
Alcyonella.
Alonia.
Amblyophis.
Amœba proteus.
Amœba radiosa.
Amœba verrucosa.
Amphiprora alata.
Anabaina circinalis.
Anabaina subtularia.
Anguillula fluviatilis.
Ankistrodesmus falcatus.
Ankistrodesmus unicornis.
Anurea longispinis.
Anurea monostylus with ovary one-half the diameter of its own body.
Anurea stipitata.
Aptogonum.

Arachnida.
Arcella mitrata.
Arcella vulgaris.
Argulus.
Arthrodesmus convergens.
Arthrodesmus divergens.
Arthronema.
Astrionella formosa.
Bacteria.
Bosmina.
Botryococcus.
Branchippus stagnalis.
Bursaria.
Campanularia.
Campascus carnutus.
Carapace of a monostyled rotifer, occupied by a parasitic mother cell with protoplasmic contents in very active motion. (Croton.)
Castor.
Centropyxis.
Centropyxis acuelata.
Chetochilis.
Chilomonas.
Chlorococcus.
Chlorogonium.
Chroococcus chalybeus.
Chydorus.
Chytridium.
Cladophora.
Clathrocystis æruginosa.
Closterium didymotocum.
Closterium lunula.
Closterium moniliferum.
Cochliopodium bilimbosum (Harriman).
Cœlastrum sphericum.
Confervoideæ.
Cosmarium binoculatum.
Cosmarium crenatum.
Cosmarium tetrophthalmum.
Cosmarium margaritiferum.
Cristatella mucedo.
Cyclops quadricauda.
Cyclops quadricornis.
Cyphroderia ampulla.
Cypris tristriata.
Daphnia pulex.
Desmidium.
Desmidiaceæ.
Diaptomas castor.
Diaptomas castor with saprolegnia attached.
Diaptomas, new species.
Diatoma vulgaris.
Didymocladon.
Difflugia cratera.
Difflugia globosa.
Difflugia lobestoma (Harriman).
Difflugia pyriformis.
Dinobryina sertularia.
Dinocharis pocillum.
Dirt.

Docidium.
Eggs of bryozoa.
Eggs of entomostraca.
Eggs of plumatella.
Eggs of polyp.
Empty shell of arcella.
Enchylis pupa.
Enteromorpha clathrata.
Eosphora aurita.
Epithelia, animal.
Epithelia, vegetable.
Eradne Nordmanni.
Euastrum.
Euglenia viridis.
Euglypha.
Eurycercus lamellatus.
Exuvia of some insects.
Feather barbs.
Fish scales.
Floscularia.
Fragillaria.
Fungi.
Fungus, red water.
Gammarus pulex.
Gemiasma verdans.
Globar rotifer.
Gomphospheria.
Gonium.
Grammatophora.
Gregarina sænuridis.
Gromia.
Hairs of plants.
Hairs of various animals.
Heleopera picta.
Holophrya brunnea.
Humus.
Hyalosphenia tincta.
Hyalosphenia formosa.
Hyalotheca.
Hyamodiscus rubicundus.
Hydra vulgaris.
Hydra viridis.
Infusoria.
Insect scales.
Lacinularia.
Lacinularia socialis.
Leaves and parts of leaves.
Leptothrix.
Leucophrys patula.
Licomophora.
Lyngbya.
Masses of sponge parenchyma decomposing.
Melosira.
Meresmopedia.
Micrasterias digitata.
Micrasterias denticulata.
Micrasterias rotata.
Microcoleus.
Milnesium tardigradum.
Monactinus octenarius.
Monactinus duodenarius.
Monads.
Mycoderma aceti.
Navicula amphirynchus.
Navicula cuspidata.
Nebalia bipes.
Nitzschia.

Nostoc communis.
Notodelphys
Oedogonium.
Oscillatoriaceæ.
Ovaries of entomostraca.
Palmellæ.
Pamphagus mutabilis.
Pandorina morum.
Paramecium aurelium.
Pediastrum boryanum.
Pediastrium incisum.
Pediastrium perforatum.
Pediastrum pertusum.
Pediastrum quadratum.
Pediastrum tetras.
Pelomyxa.
Penium.
Peridinium candelabrum.
Peridinium cinctum.
Phacus.
Plagiophrys.
Plagiotoma lumbrici.
Pleurosigma angulatum.
Plumatella.
Pollen of pine.
Polyartha platyptera.
Polycoccus.
Polyhedra tetrætica.
Polyhedra triangularis.
Polyhedrium.
Polyphema.
Polyphemus pediculus.
Protococcus.
Protococcus viridis.
Radiolaria.
Radiophrys alba.
Raphidium duplex.
Rotifer ascus.
Rotifer vulgaris.
Saccharomyces cerevisiæ.
Saprolegnia.
Sarcina.
Scales of butterfly.
Scaridium longicaudum.
Scenedesmus acutus.
Scenedesmus obliquus.
Scenedesmus obtusum.
Scenedesmus quadricauda.
Setigera.
Sheath of tubularia.
Silica.
Sphærotheca spores.
Spicules of sponge.
Spirogyra.
Sponges.
Starch.
Staurastrum dejectum.
Staurastrum furcigerum.
Staurastrum gracile.
Staurastrum margaritaceum.
Staurogenia quadrata.
Stephanocerus.
Stephanodiscus niagaræ.
Spiral tissue, etc.
Spirotænia.
Stentor.
Surirella bifrons.

Surirella gemma.
Synchœta.
Synhedra.
Synhedra splendens and many other diatoms too numerous to name.
Tabellaria.
Tetmemorus granulatus.
Tetraspore.
Trachelomonas.
Triceratium favus.
Trichodiscus.
Tryblionella scutellaria.
Ulothrix mucosa.
Urococcus.
Urostyla.
Uvella.
Vegetable fibres.
Volvox cœnochilus.
Volvox globator.
Volvox, new species.
Vorticel.
Wheat starch grains, etc.
Worm fluke.
Worm, two tailed.
Xanthidium.
Yeast.

APPENDIX.

The bad taste in Cochituate, cause of, discovered in 1879, and in Croton water, discovered in 1881, to be due to the presence of spongilla fluviatilis and lacustris and the pelomyxas.

The following facts are adduced in support of this belief :

1. Spicules of sponge were very abundant in the Croton during the time of bad taste. These spicules are most elegant forms of silica that will not polarize light. They are of various shapes. The most common one is that of a boomerang shape, exquisitely pointed at both ends, and polished like steel. Another common form in the Croton is shaped like an old-fashioned two-tined fork such as is used in a pork barrel. Some are like the little stand used on the dining-room tables to keep the blade of the carving

knife off the cloth, etc., etc. Now, this sponge itself is made up of a jelly-like substance, or sarcode protoplasm. When the animal dies, the sponge jelly or protoplasm is dissolved in the water, and goes through all filtering apparatus. For example, in Woburn, Mass., the hydrant water is taken from a gallery by the side of Horn Pond. Though this water is clear as crystal, if the nostrils be placed over a goblet of it, only a few sniffs are necessary to perceive the peculiar earthy smell, though the sense of taste detects nothing wrong. (Parenthetically, a firm brought suit against this town for loss of water power by the use of this spring for drinking purposes. My testimony, that the two waters were identical by morphological examination, helped the case for those suing for damages.)

Now an abundance of spicules shows an abundance of sponges. When Professor Reinsch and myself were studying the Cochituate water, it was a great problem to find the sponges from whence these spicules came. It always seemed to me that the minute spongilli, as found on the rocks of the bottom of ponds, did not adequately explain the presence of the sponge spicules, so I kept watching for them, and was rewarded in 1879.

2. I found in Charles River (Mass.) a fresh-water sponge that was as thick as my little finger, and between three and four feet long in linear measurement. Also a clustered mass of sponges in the same river large enough to fill a two-bushel basket.

Officials connected with the Boston Water Works have informed me that they have seen like collections of sponges in the sources of the Cochituate water. From finding the spicules so abundant in the Croton, I inferred that there is an abundance of the same sponges in the sources of the Croton water supply.

3. A portion of the Charles River sponge kept over night in a tumbler, in my room at the Wellesley Hotel, stank, in an exaggerated measure, to be sure, as the filter stank after filtering the Croton water, winter of 1880–81.

4. About January, 1881, Dr. Harriman, of Boston, my associate, and myself found portions of dead and decaying sponges in the Cochituate, they not having been dissolved. Some of the spicules were actually sticking out of the mass. The Cochituate had as bad a taste, and worse, than the Croton at that time.

5. As said before, the great mass of the dead sponges are soluble in water, and go through all filters.

It seems to me reasonable to partly attribute the taste and smell to which allusion has been made, to the presence of sponges. They die and dissolve in the water, and were it not for the tremendous draft on the supply, would, no doubt, be all disposed of by the plants and scavengers living in the water. I am aware there are some difficulties in the way of this explanation, from the fact that we find sponge spicules at all seasons of the year, and why, then, should not the taste be bad all the time? In reply to this, I refer to the abundance of the spicules being greater at the time of the worst taste. I would not be understood as claiming that the dead sponges are the sole cause of this taste, as there are a great many rhizopods (root-footed animals) in the water that die also. They are protoplasmic, like the sponges. They die, but leave more solid remains than the sponges. Dr. Harriman and myself have noticed especially the pelomyxas (pelos, mud, and mukos, mucus) animals made up of a jelly-like protoplasm, that are very greedy. They are figured in Dr. Leidy's magnificent work on the rhizopods, issued by the U. S. government. We

have found them very abundant in the Cochituate and the Croton when this bad taste was most palpable. Now as to the question whether the drinking of water impregnated with dead sponges is healthy. I am sure no one would have wished to drink the water I had in my room at Wellesley, fetid with dead sponge ; but as to the Croton, the chemists decide, I understand, that the drinking of dead sponges and pelomyxas is not and cannot be a cause of disease. Now the dicta of the chemist must be respected, as we have said, and always shall say ; but when it comes to a question so subtle as the causes of disease, as a physician I should hesitate before I pronounced definitely on the question, for the reason that there is such a great difference in people as to food. Some people will eat food with impunity that in other cases acts as a poison to others.

Again, the question of the causes of disease is by no means settled, and it will be a long time before there is an agreement. For example, take consumption. I believe in the Salisbury plan, that it is a disease primarily of the blood, caused by the vinegar yeast. Though this view is supported by the synthesis of the disease in hundreds of healthy animals killed by feeding on yeast plants, and the disease verified by examinations after death, by micro-photography of the forms in the blood, and by the cure of a large number of persons, still very few of the profession have received this view, and have expressed no opinion about it. So that supposing, for example, the question should be raised, if the dead sponges in the Croton water could cause consumption by introducing the vegetations of decomposition into the human system, I think a chemist would shrink back from it into his laboratory, as it would be so difficult, in the present

state of knowledge in the medical profession, to have the expression of a decided opinion.

How does the chemist know that dead sponges do not cause disease? Diseases do exist, but their ætiology is not found in the books of chemistry.

As a physician, I say that the question is still sub judice. To solve it will require the combined action of the zoologist, the botanist, the pathologist, and the practical physician. "But," you say, "we cannot wait for this; what shall we do until the question is decided?" If a reply is forced, I should say it would be a very sensible precaution to filter and boil the water when it tastes badly. The labors of Professor Reinsch have proved that cotton is king as a filter. This royal gift is common everywhere.

B. WATERS OF WELLS AND SPRINGS, UNCONNECTED WITH PONDS OR LAKES.

Spring Water from the Farm of Mr. George Plum, Mantua, Ohio.

Bacteria.
Diatoma vulgaris.
Epithelia from vegetables and animals.
Feather.
Linen fibre.
Mass of vegetable cells, probably of some berry.
Protococcus.
Silica or sand.
Small masses of dirt.

Sphærotheca, a fungus spore.
Starch.
Woody fibre.

Fitchburg Gas Company's Water, Specimen Furnished by Miss E. W. Beane, Teacher, July 16th, 1881.

Bacteria, few.
Cotton fibres.
Epithelial cells.
Leptothrix.
Linen fibres.
Mycelial filaments of a small water fungus.
Tabellaria.

This water has a high local reputation, and if the present morphological examination is verified by several more examinations, it must sustain a very high, if not the highest, reputation as a drinking water for the public. Here the work of filtering is done by the everlasting hills. It is an instance where the nearest approach to perfection in filtering is seen, provided the specimen sent is an average sample.

Water from Iron Tube Driven Well, West Falmouth, Mass. My own.

A few bacteria.
Oil globules.
Particles of dirt.

Pavement epithelia from human skin, probably came from the contact of a sewer's fingers who made the cotton filter.

Scales of oxide of iron.

Starch grains of wheat, that may have come from the new cotton-cloth filter used.

Epithelia made up most of the organic forms. The white cotton filter was stained red with the iron. Depth of well, fourteen feet. Soil, sandy. Location, within a hundred feet of the shore of Buzzard's Bay. Water saltish, but very cool and palatable. Supply, unfailing. It looks well to the eye.

W. A. Howland's Well, same place, Tubular.

Epithelia.

Large vegetable cell, transparent and surrounded by a flat ring.

Ditto, reminding of a cell of orange pulp.

Little dirt.

Mycelial filaments.

Oil globules.

Organic globule.

Starch.

This is nice water, and has agreeable effects on all the senses. It is down in the cellar of the house, and is about fourteen feet deep.

Water from Capt. Hoxie's Well; Has a Dead Animal Taste.

Bacteria, abundant.
Dirt, very abundant.
Epithelia in large collections.
Feathers.
Leather from new valve of pump.
Mass of decaying animal matter; dangerous water.
Monad, alive.
Mycelial filaments of yeast.
Organic globule, unknown.
Oxalate of lime crystal.
Silica.
Starch.

This was a common well, quite deep, and large enough for a man to get into. Comes through a lead pipe. Family sick and feeble.

The most striking result is the comparatively small presence in the springs and wells, namely, of organic forms of life as compared with the ordinary ditch, pool, or pond water. Still the fungi found may be more deleterious to health than all the forms in Croton, for example. This is what we are searching for. A member of the family using the well of Capt. Hoxie has had the pretubercular stage of consumption, as shown by physical micrographical explorations. Also his sputa, urine, and feces have been

obstinately loaded with vegetation till lately. We are inclined to think this water has had something to do with it, and it will be prohibited. The sputa and kidney secretions kept for a day would be disgustingly fetid, while both would be loaded with vegetation, excretal. I never had so obstinate a case before. Neither diet, sulphur bathing, salicin, or quinine seemed to affect the abundance of the vegetation until after three months. Only after the inhalation of liquid ozone, of Parke, Davis & Co., of Detroit, did the vegetative solids disappear, but I have no doubt they would reappear if the use of this water is continued. I have never met with such an obstinate case (epileptic, etc.) under the use of hydrant drinking waters. Have had one case where the urine was loaded with vegetation as it left the body. This was a Croton-water drinker, but diet alone speedily removed the vegetation.

Water from the well of the late J. F. Davis, W. Falmouth, Mass.

Bacteria.
Cotton and wool.
Dirt, abundant.
Epithelia, in abundance.
Fungus, spores, ditto, sprouting.
Leptothrix.

Mycelial filaments very abundant on culture twenty-four hours.

Woody fibres.

It was said that the chemist's examination pronounced this well water perfectly pure. We are not prepared to say that they, the fungi, caused the sickness in question, but unhesitatingly advised the disusing of the water, for, as Dr. Harriman, my associate, said, "this abundant presence of fungi shows the presence of animal matter. At the same time the result shows the truth of the positions maintained here, that chemical exploration alone is insufficient for the examination of potable water."

C. ICE.*

MODES OF STUDY.

1. A clean bag, one inch by four inches, made of cotton cloth, was tied to the escape pipe of a refrigerator, zinc lined, shelf at top, that had been washed and cleansed with filtered water. The filtrate of from thirty to forty pounds of ice was collected by inverting the detached bag into a clean goblet, then sopping the inverted bag in the filtrate, and wringing the bag also.

2. A common silver ice pitcher, porcelain lined, was cleaned with filtered Croton water and

* See Scientific American of July 29th, 1882.

filled with broken ice, source unknown, clear, compact, solid, diaphanous, and pure looking. This was allowed to melt, and one quart of water resulted, and was filtered as before.

Power of microscope, one-fifth inch objective. Eye-piece, one inch and half-inch, 350 diameters.

Many of the following list come from the air; perhaps half. Some of the specimens of ice came from ice wagons; one from a provision store. This is, of course, a partial list.

Acanthodinium, with clusters of twelve spiral cells separated in all directions.
Actinophrys sol.
Alcohol yeast.
Amœba, alive.
Anurœa monostylus.
Ascus.
Astrionella formosa.
Bacillaria diatom.
Bacteria.
Bast fibres.
Botridium cells.
Broken down tegument and substance of leaves.
Bryozoa, egg of.
Carbon.
Chitin.
Chlorococcus.
Claw of water spider.
Claws of insects.
Closterium.
Closterium lunare, dead.
Closterium, young.
Coal.
Cœlastrum sphericum.
Collection of liber fibres.
Cotton fibre.
Corn starch.
Cryptomonas lenticularis.
Daphne claws.
Dark-red organic unknown body.
Decaying leaves.
Desmid, penium.
Diatoma, not named.
Diatoma vulgaris.
Diatomaceæ, other.
Difflugia.
Difflugia, dead, several varieties.
Difflugia globosa.
Difflugia, unusual.

Dinobryina sertularia.
Dirt, debris, etc.
Dust and excrementitious matters.
Egg of the fresh water polyzoa named below, unhatched.
Eggs of entomostraca.
Epidermis of wheat.
Epilobium montanum pollen.
Epithelia, animal and vegetable.
Epithelial scales, human.
Euglenia viridis.
Euglypha.
Euglypha cristata.
Exuvium.
Feather barb.
Fibre of wool colored blue.
Fish scales.
Foot stalks of vorticells, twenty-five in number.
Fungi and spores.
Fungus filament.
Gemiasma verdans.
Gluten cells, wheat.
Gromia.
Hairs of plants.
Hairs of various animals.
Humus.
Large double body, probably eggs, but possibly vegetable.
Large masses of decaying vegetable substances.
Large paramecia.
Leaves of moss.
Leptothrix.
Liber fibres.
Linen fibre imbedded in a mass of decaying vegetable substance.
Linen fibres.
Lyngbya.
Mass of carbon.
Melosira.
Membrum. disjectum of a large entomostraca.
Monads.
Mycelial filaments, abundant.
Mycelial filaments, collection of.
Mycelial filaments of red water fungus.
Navicula.
Nebalia.
Nostoc.
One gonidia of cœlastrum sphericum.
Oscillatoria.
Parenchyma of leaf.
Parenchyma of wheat.
Pavement epithelia, five specimens.
Pediastrum boryanum.
Pelomyxas, other.
Peridinium cinctum.

Peridinium spiniferum.
Piece of a red cranberry skin.
Pitted ducts.
Polyzoa.
Portion of a leaf with chlorophyll attached, color unchanged.
Portion of a red water fungus.
Potato starch.
Protococcus.
Protococcus, probably gemiasma.
Rotifer.
Scenedesmus obliquus.
Scenedesmus quadricauda.
Shell of a cyprus.
Silica.
Silk fibre.
Skeleton of leaves.
Sphærotheca fungus.
Spiral tissues of leaf.
Starch of corn, wheat, and potato.
Staurastrum.
Supposed egg of an entomostraca.
Tabellaria.
Tetraspore.
Trachelomonas.
Transverse woody fibre.
Vegetable epithelial collection.
Vegetable hair, long.
Vegetable hairs.
Vorticell, dead.
Vorticella, two joined together.
Wheat gluten cells.
Wheat starch.
Wood fibre of various kinds.
Wool.
Worm.
Yeast, alcohol, vinegar, and lactic acid.
Yeast, vegetating filaments.

Ice from Horn Pond, Woburn, Mass. This presented considerable lightish colored deposit, in which a few animal and vegetable forms were found, but was mainly made up of epithelia and amorphous dirt. The result was unexpected, as unfiltered Horn Pond water is rich in forms of life.

APPENDIX.

In this article of mine in the *Scientific American*, as before noted, there were illustrations to the number of eight. I give, as follows, some of the descriptive text of those illustrations:

Yeast.—This is the alcohol yeast of the yeast pot, torula cerevisiæ, the spores of which are everywhere present, ready to germinate if they have the opportunity. Its presence in ice is interesting.

Bacteria.—These are minute, self-moving protoplasmic bodies. Some regard them as ultimate forms of life; others that they are but the embryonal forms, seeds, or babies (as it were) of a vegetation, yet capable of immense reproduction by division, arranging themselves into masses, chains, etc., at will. In order to know what plants they belong to, culture is necessary. It is possible that those in the cut may be the spores or seeds of the yeast plants, but it cannot be said with certainty.

Pelomyxa.—This means "mud mucus." It is an animal classed with the rhizopod or root-footed protoplasmic animals. They are very greedy, and eat much mud or dirt. The color in this case is dark amber, and may be mistaken for decaying vegetable matter. The writer regards them with suspicion, as contributing, when dead and decaying, to cause the "cucumber" and fish-oil taste that sometimes occurs in hydrant drinking waters, notably the Cochituate.

Portions of Difflugia.—These are like the pelomyxæ, only they have the property of building over themselves a covering made of particles of sand, glued together so as to protect their structural protoplasmic

bodies. Lately, the writer saw a difflugia cratera, whose shell had been broken on one side. The cilia that were usually seen at the natural opening were seen to be active at the artificial opening. The contour of the hole changed under view from circular to a narrower one, forming a segment of the first, showing an action of repair ; suddenly there was a gush of protoplasmic jelly, and the animal was dead, dying in its efforts of reconstruction.

Mycelial filaments of a red fungus, found commonly in Horn Pond, Woburn, Mass. Also at Cambridge. Name not known to writer, nor Prof. Reinsch.

A curious dark-red tubular body, fragments of which I have often seen in hydrant drinking waters. Its fracture is glassy. It is an animal substance probably, and this is the best specimen I have seen.

Trachelomonas.—These are by Ehrenberg claimed as infusoria. They are very abundant in hydrant waters at all seasons of the year. The specimen here is dead, but the living individual moves its curious long flagelliform filament, by means of which it gracefully propels itself in any direction at will.

Astrionella Formosa.—A beautiful, very common diatom, that arranges itself into forms like the spokes of a wheel. Three spokes only are given here ; usually twelve. This power of self-symmetrical arrangement is surprising and mysterious.

Bast or Linen Fibre.—This probably came from some table cloth, towel, or clothing.

An ascus or theca of a fungus, which is a part of a fructification of the fungus, and also found in lichens. It is strikingly well-developed.

Epithelia, probably animal.—These are suspicious organisms. See New York *Medical Record*, April 8th, 1882.

Egg of a bryozoa or polyzoa, found not unfrequently in the drinking waters of our cities and towns. It corresponds to the "winter egg" of entomostraca. It forms one of the four modes of reproduction, which Smith distinguishes: First. Eggs from spermatozoa. Second. From internal development (this very one). Third. External buds. Fourth. Brown bodies in empty eggs. This particular egg is seen to have an oval opening, whence the contents have been hatched or destroyed. It has been traced to a single polyp. Usually the animals live in a colony, and are met with in fresh water on stones, sticks, sides of flumes, and free. I have seen colonies of these bryozoa in masses as big as a bushel basket, hanging on and covering the perpendicular boards of a flume. In the present case, the egg is nearly as large as the animal in a state of rest. Its detection shows decidedly the presence of animal life in ice.

Dirt is hard to picture, but should have a place in this morphology, though it has been defined as "matter out of place."

Tabellaria.—Diatom found commonly in all surface drinking waters. They have the power to arrange in rows, and the specimen has fifteen individuals in one aggregation, which is a small one. Diatoms are regarded as plants by the majority of observers. A good deal of difficulty arises from trying to measure things with the lines and plummets of past times, when the things in question were absolutely unknown, and hence could not be properly named at the date when the word "plant" was invented. As knowledge increases, names must be changed. The diatoms are generally regarded as innocent, though some observers take the opposite ground.

Epithelia.—These are probably human, washed into

the water, and frozen into the ice. They are constantly thrown off in washing, sputa, and the excretions of the body. They are also found on all other vertebrate animals and on vegetables.

"Mycelial filaments of a vinegar yeast found in connection with melting ice. At the bottom are the embryonal spores of the yeast."—*Scientific American*, p. 73, col. 2.

This shows what happens when ice-water is allowed to stand exposed to the action of the air. A long, dirty, grayish, gelatinous ribbon, half an inch wide and about one-eighth inch thick, appeared to be a mass of what is called "the mother of vinegar." The cut gave the appearances under the microscope. The significance shows what is the full development of some of the embryonal forms of life found in ice-water when subjected to conditions that are present in refrigerators.

It must be remembered that these are not the full lists of what were examined. Some could not be named. Neither can it be said here that it has been settled that ice is injurious or not. But enough testimony is here given to indicate that ice should not be used in water; but if the water must be cooled, let it be done by placing jars of water in ice.

D. AIR.

The idea that air is food is found in Hindustanee language of three thousand years ago. The word animal infers air to sustain life. If any one doubts this position as to air being food, let him hold his breath for five minutes.

There are many ways to study this morphology, among which are:

1. Moisten the cleaned tip of one's finger with distilled or filtered water, or water whose morphology is known, then touch it to the top of some article of furniture. Instantly the tip will be covered with dust or forms that have mounted through the air to rest where found. This dust can be transferred to a slide, covered, and examined. I think this the quickest and easiest mode.

2. Ice. Let a piece of ice melt in the air to be examined. Instantly there is a current of air towards it bearing the forms against the moist surface of the ice; they stick, and can be removed on to a slide, covered, and examined under the microscope. Or, the ice may be allowed to melt in a vessel, and the resultant water explored as in water examinations.

3. Exposure of slides moistened with glycerin or not, with or without a cone attached to a vane, so that the air impinges on the slide.

4. Air may be filtered through a cotton bag, and then the bag reversed and washed in filtered water.

5. A slide may be placed on a flat surface, or on pins or legs, so as to catch the forms that fall or that are forced from below, as in ague districts.

6. Snow may be taken in a can or pail, or any receptacle that has been cleaned with dis-

tilled or filtered water. The snow allowed to melt, and the water filtered; the filtrate will be found to contain many forms.

It is astonishing how the air in motion will carry solids. In San Francisco, I saw sand from the Pacific Ocean dried and blown in such quantities as to go over houses and bury street lamps. I have read of moving mountains of sand. Perhaps the writer may say that he writes on the eighth floor of a large apartment house, where he expected to be free from the dust which annoyed him at a past residence on the second floor, but the fact is, his microscope glass table is covered in one day as much as in three at the former residence. Such facts deserve attention of those who study malaria, and such must expect to find the morphology of the air mixed with the other morphologies; still it will not do to attribute to the air things that belong to other morphologies. The carrying properties of air are underestimated by people not housekeepers.

The morphological study of the air prepares one to be careful in rejecting evidence which shows the route of invasion of diseases by the medium of the atmosphere through the air passages.

Ague plants.

Algæ.

All dusts from soils.

Anything that comes from the wear and tear

of the multitudinous operations of life everywhere, whether dried and blown by currents of wind, or by heat, or diffusion of gases.

Asthmatos ciliaris.
Automobile spores.
Bi-acicular crystals, etc.
Coal.
Cotton.
Crystals of chloride of ammonium.
Diatoms.
Epithelia.
Fat globules.
Feathers of birds and insects.
Fungi spores and macrospores.
Hairs of animals and plants.
Insects and parts of insects.
Leather.
Linen fibre.
Palmellæ.
Paper.
Pigment matters.
Pollens of plants.
Pus.
Silica.
Smoke products.
Sphærotheca pyrus.
Spores and young plants of:
  Protuberans gelatiformis.
  Protuberans lamella.
  Protuberans ovalis, with dried incrustations of the same.

Spores of cryptogamic vegetations of the sick carried by the sweat.

Starches.

Vibriones.

Volcanic dust.

Winged seeds, etc.

Woody fibre.

Wool.

Yeast spores, alcoholic, lactic acid, butyric acid, etc.

Zoospores

E. MORPHOLOGY OF FOODS, ANIMAL AND VEGETABLE.

The limits of this work having been exceeded, only a passing allusion can be made to this large, fruitful and important field, which is close at hand, easily manipulated and intensely interesting and profitable. There are four phases in which the morphology should be studied.

1. *Uncooked.*
2. *Cooked.*
3. *After migration through the alimentary canal.*
4. *Adulterations.*

1. UNCOOKED.

For example, take the potato; its skin, cortical substance and parenchyma should be studied in

thin sections, and all the forms noted, whether the names are known or not. Among these are the epithelia, cork cells, connective fibrous tissues, spiral tissue, pitted ducts, gubernacula leading from the "eyes" to the centre of the parenchyma, the reticulation of a cross section, the starch grains filling such a section, as eggs in a basket, the various sizes, shapes, concentric markings of the starch grains, the action of the polarized light on the starch and cellulose, etc., etc.

2. COOKED.

By boiling, steaming, or action of hot fat. See if the starch polarizes the light; if so, the potato is not fully cooked. See the sacs of the potato substance embracing the starch grains, which, if well cooked, should be converted into a homogeneous mass all mixed up together, with no sign of the uncooked egg-shaped forms they had before cooking.

3. EXAMINED IN THE FECES

Of the eater; if any of the sacs are found, that have not been digested, the clinical examiner must study to find out if the fault lies with the alimentary canal, which has allowed the potato sacs to traverse it undigested. If the contents of the sacs are not broken up or homogeneous, and do not polarize light, the fault

must lie with the digestive apparatus. Generally, when a food that is properly cooked, or raw, runs through the alimentary canal intact, it should be avoided. It is folly to give the digestive system problems which it is unable to solve. Better change to something else that will digest or administer such remedies as will make them digest. Here is a beautiful field of study; I say beautiful, because its lessons are so clear and instructive, and because some of the finest specimens of polarized light are found in the feces.

As to beef-steak.

1. Uncooked, note its beauty under polarized light, the trichinæ (if present), the physical appearances of the fibrillæ, the amount of fatty infiltration, the amount of connective tissue, etc., etc.

2. Cooked.—The shrinking in size, the absence of polarization, the darkened color approaching black.

3. In the feces, if not broken up into a fine homogeneous mass, like a solid extract in which no forms of muscular fibre can be detected, it is not thoroughly digested. If the muscular fibres are found undigested, they tell their own story plainly.

It must be remembered that the connective, areolar, and fibrous tissues from the vegetable

kingdom are almost all insoluble in the juices of the alimentary canal, and must be expected to appear in the feces of healthy digestion.

The above list might be extended by including celery, cranberries, grapes, peaches, wheat, oats, barley, rye, melon, specially watermelons, which show beautifully protoplasm in active motion, tomatoes, corn, squash, sweet potatoes, mustard, bread of all kinds, cake, crackers, pilot bread, unleavened bread, wines, dough, yeast from sour bread, etc., etc., etc.

The use of the polariscope is invaluable as a test for cooking. The writer has used it for many years, and was probably the first to call attention to its great value as a test for cooking. The morphology of foods throws great light on the alcohol question.

4. ADULTERATION OF FOODS.

This department would fill a book, but attention can only be called to it here. So long as money can be made by false dealings as to foods, just so long is there need of protection by a knowledge of the morphology of adulterations of foods.

The statements of the interested parties should be tested by the microscope. For example, if an article claims to be pure coffee, it should prove to be so under the microscope. A study of a genuine grain of coffee will give

the clues, and a study of chicory will also be of help, as it is generally used for adulteration of coffee. Indeed, the adulterations of all spices, black pepper, for example, with ground button-wood bark, have been going on for years, and will probably go on till this subject is properly understood, and this will be when microscopes are as common as pianos and organs. May this time soon come!

The morphology of food is easiest of all to study, and no one should give decided opinions before practical knowledge is acquired; those who have never had their attention called to this subject, will find its investigation to be a great revelation as to human nature.

Infants' Foods.

The writer must content himself with referring to his monograph on this subject, which will be furnished on application to him. It is sufficient to say here that most of them fall short of their claims, and should be given a wide berth. Far better is it to feed during motherhood so that there shall be an abundance of healthy milk, to wit: two-thirds animal and one-third vegetable food (see "Food in Motherhood," by author, about to appear), and then there will be no need of artificial feeding of infants.

Should this present work be encouraged by

the profession, the writer will give a fuller treatment of the morphology of foods, which will involve considerable expense of time, labor, and money, and which, by good right, should not be done by private enterprise, but under governmental patronage, because it has the most intimate relations to the welfare of its most precious articles of value in the nation, to wit: the human beings within its confines.

VIII.

MORPHOLOGY OF CLOTHING.

This is a practical question, showing how to have no cheats in clothing; but it assumes a more intense interest in its medico-legal relations, for example, the examination of blood stains on coats, shirts, pockets, money bags, greenbacks, etc., etc.

Everything found in the morphology of the air and dirt must be expected here, added to the morphology of dried blood. Careful mensuration and inspection of the suspected blood must be made amid the crowd of other objects, such as silica, feathers, starch of all kinds, pollen of many kinds, pigment matters, hairs of plants and animals, fibres of textile fabrics, animal and vegetable tissues, fungi and algæ, and so forth.

Corpuscles of various shapes distorted in drying or not may be found. Now and then, perfect ones can be found alone, or buried wholly or in part in the clot.

When the stains have been washed with water to remove them, as water is the best thing for this purpose, the morphology is still

more difficult. Yet making allowance for this bleaching detergent process, much valuable information can be had which, while it does not positively convict or release, points the way out to conviction or not, as the case may be, very strongly in doubtful cases. In our present state of knowledge, no one should be hung or set free simply upon the blood evidence alone, unless the claim is made that the blood stain is one of the bird family, whose corpuscles are oval and whose white corpuscles are smaller than the red. The microscope should not be made to prove more than belongs to its domain.

To examine water morphology,* filter through cotton bag, about one and one-half by four inches, with as gentle a pressure as possible. When the water begins to bore through in jets, stop flow. Remove bag, empty into a goblet, turn bag inside out and sop in goblet a short time. Squeeze bag by twisting. With a pipette remove specimens on to a slide and cover, or, better, have a slide with an open cell, two by two-thirds inch, one-eighth inch deep, and place specimen on horizontal stage; one inch, one-quarter to one-tenth inch objectives.

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* See pages 49 and 58.

IX.

MORPHOLOGY OF THE UTERINE AND VAGINAL DISCHARGES.

Ascarides and eggs.
Blood-corpuscles, red and white.
Botrytis infestans.
Cancerous tissues.
Cholesterin.
Ciliaris bicaudalis.
Colloid of ovarian tumors.
Colloid secretions from epithelia.
Crypta irregularis.
Crypta syphilitica.
Cryptococcus gonorrhœa.
Epithelia, ciliated.
Epithelia, cylindrical.
Epithelia, pavement.
Fibrin filaments.
Foreign substances, accidentally or purposely introduced.
Gemiasma verdans, etc.
Gravel.
Menstrual blood.
Morphology of feces in cases of recto-vaginal fistulæ.

Morphology of the urine in cases of vesico-vaginal fistulæ.

Mucous corpuscles.

Mucous filaments.

Muscular tissues in degeneration and sub-involution.

Ovarian corpuscles.

Ovum, human.

Penicillium pruriosum.

Pus.

Sarcoma.

Spermatozoa.

Torula aggregatus.

Torula utero-catarrhalis.

Tricocephalus catarrhalis.

Tricocephalus dispar and eggs.

Trichomonas irregularis.

Trichomonas vaginalis.

Vernix caseosa.

Yeast, acetic.

Yeast, alcoholic.

Yeast, lactic.

Zymotosis utero-catarrhalis, etc.

DEC. 21ST, 1888.

X.

MORPHOLOGY OF SOILS.

SPECIALLY USEFUL IN STUDYING MALARIA, CREMATION, TYPHOID FEVER, ETC.

Of course, it must be expected that all the bodies found in the morphologies of the air and water will be in this morphology: notably in malarial investigations in the morphology of soils in the beds of ponds or streams which are alternately covered or uncovered by water. It is a curious fact that such localities, when permanently dry or wet, do not develop the plants of ague. The practical deduction is, to keep the ponds either full or dry, and the ague will cease as the plants stop growing. This morphology is clinical and is not exhaustive of the subject.

Algæ, named and unnamed.

Anguillula fluviatilis.

Automobile spores of all kinds making incrustations.

Bacteria of many kinds.

Biciliated zoospores.

Biolysis typhoides.

Botrydium infestans.

Chroococcus minutus.
Chroolepideæ.
Crystals, acicular.
Diatoms.
Difflugia cratera.
Fungi in mycelial filaments.
Gemiasma alba.
Gemiasma paludis.
Gemiasma plumba.
Gemiasma rubra.
Gemiasma verdans.
Hyphomycetes.
Oscillatoriaceæ.
Palmellæ.
Penicillium.
Protococci.
Protuberans gelatiformis.
Protuberans lamella.
Protuberans ovalis.
Puccinia.
Quartz and fragments of all rocks and minerals found in Petrology.
Rhizopods.
Silica.
Sphærotheca.
Spongue spicules.
Spores of cryptogams.
Torula.
Vibriones.
Yeast.
Zoospores.

LIST OF LANTERN SLIDES

FOR EXHIBITION BY

E. CUTTER, M.D., LL.D.

Microphotographs, if not stated to the contrary.
*This list subject to change at any time.**

JANUARY, 1889.

I. THE BLOOD.

1. Ox, one-fiftieth inch objective, Tolles.
2. Dog, ditto, ditto.
3. Mouse, ditto, ditto.
4. Pig, ditto, ditto.
5. Sheep, ditto, ditto.
6. Horse, ditto.
7 Trout, ditto, ditto.
8. Frog, one-tenth inch objective, U. S. Army Museum.
9 Bluebird, one-tenth inch objective.
10. Healthy human adult's blood, drawing (Salisbury).
11. Healthy human blood, one-tenth inch objective.
12. Human red blood-corpuscle, one-fiftieth inch objective, enlarged by camera.

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* The microphotographs were taken by G. B. Harriman, D.D.S., of Boston, and the writer, unless otherwise noted.

13. Human white blood-corpuscle, ditto, ditto.
14. Human white blood-corpuscle, healthy, ditto, ditto
15. Amœboid movements white blood-corpuscle, drawing, from solar projection with one-tenth inch objective.
16. Ditto, another specimen.
17. White blood-corpuscle, consumptive, one-fiftieth inch objective.
18. Three ditto, ditto, one-fiftieth inch objective.
19. The same with one-seventy-fifth inch objective; the first ever taken with this objective; 1876.
20. Two white corpuscles, consumptive, one-seventy-fifth inch objective.
21. The same enlarged by camera.
22, 23. White blood-corpuscle, consumptive, showing entophytal growths, according to Professor P. F. Reinsch, of Erlangen.
24, 25. Consumptive blood, under the one-fiftieth inch objective.
26. Ditto, ditto, with one-seventy-fifth inch objective.
27, 28. Consumptive blood, fourth stage, one-sixteenth inch objective.
29. Fibrin filaments consumptive blood, one-fiftieth inch objective; first ever taken with this power; 1876.
30, 31. Pretubercular blood.
32. Eczema, drawing (Salisbury).
33. Anæmia, drawing (Salisbury).
34. Consumptive blood, first stage, drawing (Salisbury).
35. Blood in fibrous consumption, drawing (Salisbury).
36, 37. Consumption, second stage, drawing (Salisbury).
38. Mycoderma aceti, one-fiftieth inch objective.

39. Consumption, third stage, drawing (Salisbury).
40. Consumption, fourth stage, drawing (Salisbury).
41. Ditto, ditto, ditto.
42. Ditto, last part of fourth stage, drawing (Salisbury).
43. Consumption, fourth stage, one-sixteenth inch objective.
44. Consumption, fourth stage, and after six months' treatment, drawing (Salisbury).
45. Consumption, fourth stage, one-sixteenth inch objective.
46, 47. Hog cholera, blood in fatal case, drawing (Salisbury).
48, 49. Fibræmia, drawing (Salisbury).
50. Fibræmia, in skeins, drawing (Salisbury).
51. Emboli in rheumatism and thrombosis, drawing (Salisbury).
52. Cystine in rheumatism, drawing.
53. Ditto, ditto, ditto.
54. Ditto and pigment matters, drawing.
55, 56. Fibrin in hog cholera filling terminal blood-vessels drawing (Salisbury)
57. Blood of boils, one-tenth inch objective.
58. Crypta syphilitica filament, one-sixteenth inch objective.
59. Ditto, one-fourth inch objective enlarged.
60. Ditto, spores, one-seventy-fifth inch objective.
61. Ditto, in white corpuscles, one-tenth inch objective.
62, 63, 64, 65, 66, 67, 68, 69, 70, 71. Action of alcohol pushed to the extreme on living human blood-corpuscles, series taken by Dr. Harriman, alone; one-sixteenth to one-seventy-fifth inch objective.
72. Hunting for ague plants in the blood with a one-

tenth inch objective mounted in a Cutter clinical microscope; direct candle light.

2. SPUTUM.

1. Epithelial cell, pavement. U. S. A. Medical Museum.
2. Leptothrix existing in tongue papillæ, drawing.
3. Lactic acid vegetations, ditto.
4, 5, 6. Vegetations of croup, drawings from Professor Reinsch.
7. Spores of membrane of Diphtheria unkilled by three and a half years' sojourn in strongest carbolic acid.
8. Granular encysted, acicular and massive gravel, drawing.
9. Triple phosphate, drawing.
10. Granular, encysted, acicular and massive gravel, with pigment, drawing.
11. Gravel with spirilina splendens, after Salisbury, drawing.
12. Ditto from asthma and hay fever, drawing.
13. Ditto with cystine, drawing.
14. Spirilina splendens with massive gravel, drawing.
15. Gravel, drawing.
16, 17. Lung fibre in consumption, drawing, Salisbury.
18, 19, 20, 21, 22, 23. Asthmatos ciliaris, some of the microphotographs with one-seventy-fifth inch objective; also drawing.

3. FECES.

1. Tapeworm eggs, fat, ligamentum nuchæ (?), drawing.

2. Muscular fibre, apple, drawing.
3. Serolin and vegetations in consumption, drawing, Salisbury.
4. Banana tissue, drawing.
5. Celery tissue, drawing.

4. SKIN.

1. Vaccine virus.
2. Epithelia infested with vegetation, drawing.
3. Ditto.
4. Skin morphology with large shred of lung fibre, drawing, Salisbury.
5. Epithelia of skin in consumptive blood.
6. Scrapings; cotton fibre, macerated, etc.

5. URINE.

1. Uric acid, drawing.
2. Monstrous spermatozoa, drawing, Salisbury.
3. Monstrous spermatozoa, drawing, Cutter.
4. Infected epithelia and giant mucous corpuscles in diphtheria, drawing.
5. Anabaina subtilissima, drawing.
6. Fatty epithelia in Bright's disease; abnormal giant mucous corpuscles, drawing, Cutter.

6 FOODS.

1. Leavened bread, 17 diameters.
2. Leavened bread, 25 diameters.
3. Unleavened bread, 17 diameters.
4. Longitudinal section of grain of wheat; after Hand; drawing.

5. Cross section grain of wheat, drawing, ditto.
6. Cross section of periphery of grain of wheat, ditto.
7. Flour, common, drawing.
8. Bermuda arrowroot starch, drawing.
9. Imperial Granum, drawing.
10. Victor Baby Food, drawing.
11. Gluten Flour Health Food, drawing.
12. Durkee's Glutena, drawing.
13. Redmond's Cerealine, drawing.
14. Baby Sup, drawing.
15. Arlington wheat meal, drawing,
16. Franklin Mills entire wheat flour, drawing.
17. Franklin Mills entire wheat flour, drawing.
18. Mellin's Food, drawing.
19. Alcoholic yeast plant in activity (saccharomyces cerevisiæ).
20. Gaffe and Fleischmann's yeast in action, one-fiftieth inch objective.
21. Ditto, ditto, another view, one-fiftieth inch objective.
22. Ditto, ditto, with bacteria, one-fiftieth inch objective.
23. Mycelial filaments (aerial), vinegar yeast, one-sixteenth inch objective.
24. Mycelial filament from mother of vinegar in escape pipe of refrigerator, drawing.
25. Mother of vinegar, lager-beer drips, drawing.
26. Alcoholic and vinegar yeast, lager-beer drips. Do.
27. Alcohol and vinegar in bloom of grape, drawing.
28. Mycelial filaments lager beer, drawing.
29. Lactic acid, alcohol and vinegar, drawing.
30. Gaffe and Fleischmann, alcohol yeast, one-seventy-fifth inch objective.
31. Ditto, ditto, another print.

32. Ditto, ditto, another specimen.
33. Protoplasm of watermelon pulp cell, showing active motion, drawing.
34. Cranberry pulp.
35. Lard, one-sixteenth inch objective.
36. Soap, one-sixteenth inch objective.
37. Rancid butter, one-sixteenth inch objective.
38. Cantelope melon cells with protoplasm active, drawing.
39. Baked beans, drawing.
40. Peach, hairs and substance, drawing.
41. Peach tissues, drawing.
42. Peach substance near and in the skin, drawing.
43. Tomato, raw and cooked, drawing.
44. Pulp of grape skin, drawing.

DRINKING WATER.

45. Pleurosigma.
46. Triceratium favus.
47. Saprolegnia plant.
48. Actinophrys sol, photo.
49. Ditto, drawing.
50. Volvox, drawing.
51. Parasites in desmids, drawing. (Reinsch.)
52. Polyarthra platyptera, drawing.
53. Cyclops quadricornis.

AIR.

54. Sewer gas vegetation, one-tenth inch objective.
55. Dust on furniture, one-fiftieth inch objective.

Fig. 1.

Fig. 2.

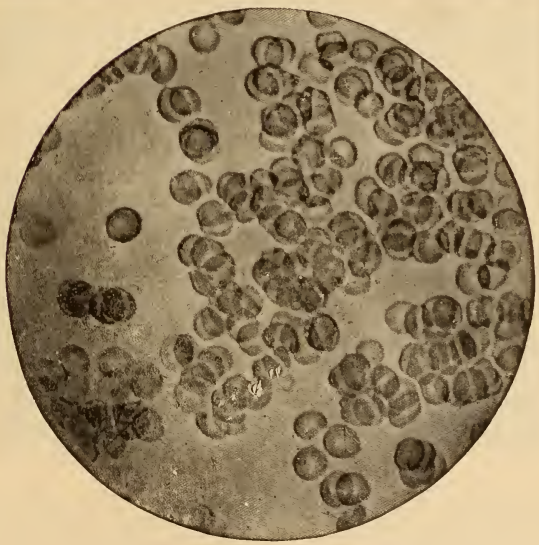

FIG. 1.—Microphotograph, one-fiftieth in. objective, Tolles. Taken in 1876, by E. Cutter. Healthy blood. Special object focussed for was the white corpuscle. Compare it with Fig. 1, Plate III.
FIG. 2.—Healthy blood, one-sixteenth inch objective, Tolles. E. Cutter, 1883.

Plate II.

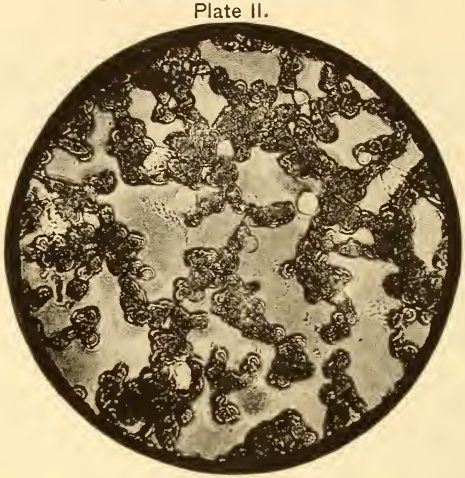

Fig. 1.

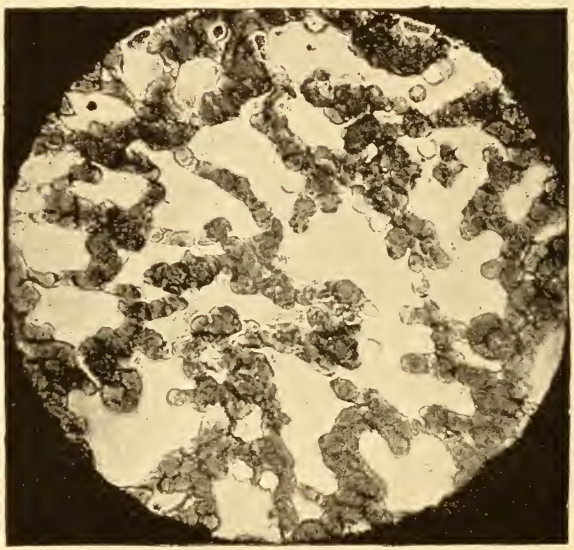

Fig. 2.

FIG. 1.—Ropy, sticky and adhesive blood as found in cases of Tubercle and Rheumatism. Here it is from Tubercle and contains vinegar yeast. Microphotograph, one-sixteenth inch objective. E. Cutter, 1876.

FIG. 2.—Microphotograph, one-sixteenth inch objective of Tolles. Tuberculous blood; case under treatment and shows improvement. There is an endeavor to rouleaux rightly. The vinegar yeast is not so plenty. E. Cutter, 1876.

Plate III.

Fig. 1.

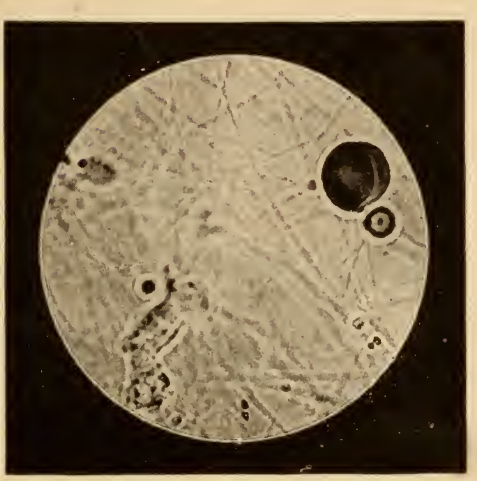

Fig. 2.

FIG. 1.—Microphotograph, Tolles, one-seventy-fifth inch objective. The first taken; by E. Cutter and G. B. Harriman, D.D.S., of Boston, 1876. Tuberculous blood. Three white corpuscles distended and the fourth ruptured by spores of vinegar yeast.

FIG. 2.—Microphotograph, 1876. E. Cutter. Taken with Tolles' one-fiftieth inch objective. Fibrin filaments in excess as found in tuberculous, embolic and rheumatic blood.

Fig. 1.

Fig. 2.

Fig. 3.

FIGURES 1 & 2.—Crystals and crystalline bodies found in the blood of cases of Rheumatism.

FIG. 3.—Crystals of cystine found in the blood of a case of Sciatica.

See also Food and Tubercle. E. Cutter. Plate II, Fig 1, and Plate III, Fig. 2.

Crystals, crystalline bodies, and gravel found in asthmatic expectoration and in hay-fever; also Spirilina splendens (Salisbury), in obstinate cases of Asthma. (E. Cutter, 1883.)

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FOOD VERSUS BACILLI IN CONSUMPTION

(OPUS 286.)

AN OPEN LETTER

—FROM—

EPHRAIM CUTTER, M. D., LL. D.,

Corresponding Member Société Belge de Microscopie; Associate Member Philosophical Society of Great Britain; Honorary Fellow Society of Science, Letters and Art (London); Principal Medical Department of Instruction, American Institute of Micrology; Member Committee for the Revision of the United States Pharmacopœia, 1860; Life Member New York Institution for the Deaf and Dumb; Member American Medical Association, American Society of Microscopists, etc., etc.

TO HIS SON,

JOHN ASHBURTON CUTTER, M. D., B. Sc.,

WITH ANSWER.

[*Reprint from Virginia Medical Monthly, December, 1888.*]

"A capacity to do good not only gives a title to it, but makes the doing of it duty."—DUKE OF BRANDENBURG, 1691.

NEW YORK:
THE ARISTON, BROADWAY AND 55TH STREET.
PUBLISHED BY THE AUTHOR.
1888.

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Food versus Bacilli in Consumption.

"I have long ago ceased to regard all the bacilli, micrococci, and bacteria, etc., as ultimate forms of animal or vegetable life. I look upon them as simply the embryos of mature forms, which are capable of propagating themselves in this embryonal state. I have observed these forms in many diseased conditions; many of them in one disease are nothing but the vinegar yeast developing, away from the air, in the blood, where the full development of the plant is not apt to be found." * * * "The very name *specific* should be blotted from medical science, and left entirely to the quack, who knows nothing else. There is really no such thing in medicine. All we can do in any disease is to aid nature, and to follow her as closely as possible in her curative processes; and this we can only do wisely and well by understanding fully the true cause and pathology of every disease we treat."—(*Salisbury—McNaughton Prize Essay on Malaria.*)

You ask me to give you clearly how far bacteriology comes short, compared with the actual state of practical clinical knowledge as realized by Dr. Salisbury, myself and others? I will do so as well as I can in the paternal relation, one which is not ordinarily used to inculcate falsehoods, untruths or things of no value.

I start out with the general proposition that your business as a physician is, to cure and prevent disease. When patients come to you, you are to cure when you can; when you cannot, you are to relieve and prevent disease if you can. Your duty is to use legitimately all the means within your reach to produce these ends. Let us look at our subject in this light.

Taking consumption to mean consumption of the lungs

or bowels, sometimes called tuberculosis of those parts, let us see what bacteriology has done, and then look at the food side of the question.

I. *Bacteriology* is a science in medicine, introduced by Dr. Koch, since 1880. It shows:—(1) The cause of consumption to be bacilli, which may be cultivated by inoculation in animals and produce consumption in them. This has been doubted, but I am willing to concede it.

(2.) Dr. Koch has been endorsed, titled and set up by the German Government in a laboratory, and has published his researches in a most magnificent manner.

(3.) Chairs of bacteriology and laboratories have been set up in medical colleges in many places and countries. All these go to show that bacteriology is the most popular and well received thing in the etiology of consumption, and of course superior to every other.

Indeed, the First International Tuberculosis Congress of nearly five-hundred medical men has lately been convened at Paris, which taught, if the report I saw was correct,—(a.) Boil your milk and have your meat well cooked. (b.) Consumption is contagious from man to animals, with a decree to make cattle liable to seizure by meat inspectors. (c.) It comes in milk also, by inhalation, and the inoculation of saliva of patients. (d.) Preventive inoculation is useless. (e.) What we need is some agent that will kill the bacillus. (f.) We do not say the disease is incurable. (g.) The malady is in the blood. This is the height and depth of bacteriology. It shows the cause, gives no directions for treatment, but shows no cures while admitting their possibility.

II. Let us now look and see what has been done for twenty-five years on the *food side of consumption*, premising that the injunction to cook the meat and milk thoroughly, the admitting the curability of phthisis and its being a blood disease, make my task easier, for it concedes what I want you to know and practice, and what has been known and practiced here for more than twenty-five years.

You know my motto for 1879, beautifully engrossed and intended as an heirloom. It reads, "In my opinion, should

the experience of Dr. J. H. Salisbury and myself for the past 21 years be realized by all regular physicians in these United States, at least 13,000 lives would be annually saved by the detection and treatment of the pretubercular state alone." Let this make *item number one.* This motto is backed by an unpublished volume entitled, "A New Physical Sign of the Pretubercular Stage of Consumption. By E. Cutter, M. D. *Esse quam videre.* Illustrated by sixty-nine original microphotographs taken with objectives ranging from the 1-4th to the 1-75th inch, 1877, pp. 211."

Item 2. In 1858, one thousand swine were fed by Dr. Salisbury on sour swill for three months; one-quarter of them died, and 104 were autopsied and found to be consumptive. (See A No. 1 Bibliog.)

Item 3. By the side of these, about one thousand other swine were kept on sound sweet corn for the same time; none died. Had consumption been contagious they should have caught it.

Item 4. Consumption has been cured, is being cured, and will be cured by proper feeding on the plans laid down in "The Relation of Alimentation and Disease," by J. H. Salisbury, M. D , LL. D. New York: (J. H. Vail & Co. 1888). You remember your brother Ben's case, how, in 1876, he was in the pretubercular state, how I kept him from going to Germany for his musical education for one year till he was cured, how he went, afterwards got sick again, and was said by his German physician to be in consumption, how I wrote him to live as he did before, how your mother being sick almost to death (see Diet in Cancer, Case IX *Albany Medical Annals*, July and August, 1887) and worrying about him, I had him come home to have his blood examined, to see how it really was; how that he got well and remains so now. You know Mr. Luther Whiting Mason, sick in the same way in 1877, how he was cured, went to Japan and introduced Western Music in the public schools, backed by the Cabinet of the Imperial Government. This great result is due to his cure. Besides these cases, you know of more in my practice of a worse character. Add to these the hundreds that Dr. Salisbury has cured. There is evidence

enough to show that this terrible disease is being cured, was being cured twenty-five years ago, and will be cured in time to come (see No. 13 B in *Bibliography,* appended) whether acknowledged or not. I hope you will not take the position of Dr. ——, who, after I had tried to have an understanding on this subject, said, "I don't care if you do cure a case of consumption, I will not believe it." The Tuberculosis Congress does not say this. Nor will you, I hope, follow the example of an official of a medical society I once belonged to. I said to him, "If you will be kind enough to take a dispensary case, bring him in before the society, examine him before the members and pronounce him to be a case of consumption, *I will try to cure him.*" *He did so,* and the official said it was a *cure* after I had got through with him, but that the case was *not consumption.*

Item 5. The plans in question tell how to diagnosticate a case of consumption by the blood morphologies when the ordinary physical signs of auscultation and percussion do not. It settles the question at once. This will be of great value to you, I know from my own experience. Bacteriology does not do this. This new physical sign of the pretubercular state is invaluable in army, navy and other health examinations, specially in life insurance examinations. (See Nos. 1—A; 1, 21—B *Bibliography.*)

Item 6. The plans in question show how to run a case intelligently, to know when a case is cured, to know exactly what food can be allowed by its action on the blood, to show lapses in diet, to keep patients from deceiving, and convincing them that there is no use in trying to deceive as to food. Bacteriology does not do this.

Item 7. The plans in question intimate that nature is the great healer: (1st.) By giving healthy normal food, and (2d). By removing food causes. This was found out by feeding singly on all common articles of food, seeing what diseases they cause in their way, and showing that almost without exception, beef properly prepared can be a healthful food indefinitely. (See A—1 *Bibl.*) (3d.) Medicines do not cure. They oil the machine and are useful as lubricants, so to speak. You may have a locomotive in order

and fired up, but it must be oiled ere it can work. Bacteriology holds out a hope of a cure by killing the bacilli by some agent, but does not state what agent. I would rather you would cure than have a hope to cure to practice medicine with. By the way, I mean curable, like typhoid fever, for example. The plans never claim to cure all the cases. If patients follow directions strictly, and do not work, nor worry, nor play too hard, you may reasonably expect to cure two-thirds, provided they take time enough; say from two to three years. Three-fourths of the swine that had consumption did not die of it, but nature eliminated the disease. Perhaps they might have died in time, but they were slaughtered for food. Thorough cooking kills the possibility of communicating the disease. This was known years before the Congress of Tuberculosis promulgated it. I am glad that it was promulgated. It makes things much easier for me.

Item 8. What is consumption as defined by the plans? Partial paralysis and interstitial death caused by the mycoderma aceti and other acid yeasts, growing in the blood, making thrombi which become emboli in the lungs and in turn the nidus of tubercle. This yeast comes from fermenting food in the small intestines, and hence becomes absorbed into the vascular system. Experiments with all our common foods show that nearly all, save beef, will, when exclusively fed on for forty to fifty days, ferment and infest the blood with the vinegar, lactic acid or other yeasts and cause tuberculosis. So long as food causes consumption it is in vain to expect to cure a case unless proper food is eaten.

For thirty-five years observers have noticed the bacillus of Koch living with the vinegar yeast. Botanists were divided in opinion whether they were inseparably a part of the life history of the mycoderma aceti, though nearly always found associated. Some botanists thought they were indispensable parts, and some thought not. *They are the babies of the vegetations and can be propagated as babies.*

Item 9. Bacteriology makes no account of the morphology of consumptive blood as Dr. Salisbury does. It may point out bacteria, but it does not point out the following:

1. *As to the red corpuscles.* (a.) Their huddling and grouping together like frightened sheep. (b.) Their sticky and rotten substance. (c.) Their unrounded out, unplastic outlines. (d.) Their loss of ruddy color. (e.) Impoverishment.

2. *As to white blood corpuscles.* (a.) Their enlargement, usually sometimes enormously distended by the mycoderma aceti. (b.) Their increase in number. (c.) Their variation in size.

3. *As to the serum.* (a.) Fibrin filaments enlarged, thickened, stronger, more numerous and visible than in health. (b.) Mycoderma aceti in single spores or aggregated into oblong, sometimes double ended masses, forming thrombi and capillary emboli, specially in the lungs, where when held, the mycoderma aceti grows, increases, and acts chemically and mechanically in the tissues forming as a result of the life, chemical and mechanical action, a nidus for what is called tubercle, producing local paralysis and interstitial death, to name no more.

You know how useful this blood morphology has been in my practice and yours in giving the patient something definite to go for—*i. e.,* the riddance of the yeast from the blood and the re-establishment of the normal blood morphology. You know how often after having got the blood normal, that in less than twenty-four hours it may be thrown back to the morphology of consumptive blood by the patient eating one teaspoonful of sugar or one mouthful of forbidden food. You know that foods for the consumptive are selected, not because they taste good, look good, and are recommended by loving friends, but according to how they bring back or not the morphology of consumptive blood. You know how patients are detected in lapses of diet by the blood morphology, *and yet all this is more than a quarter of a century old.*

Item 10. Bacteriology takes account of the sputum, but only to look for the bacillus. There is an advantage in looking for one thing; it gives a unity of aim, but it is recent. The plans here advocated have, for the past twenty-five years, included the entire morphology of the sputum

as known. (See *Morphology of the Sputum*, Numbers 1—A; 1—B, *Bibliography*.) I can name only a few here: Elastic lung fibres, inelastic lung fibres, lumen of blood-vessels, mycoderma aceti, saccharomyces cerevisiæ when there are lung cavities, blood, giant mucous corpuscles, gravel of the lungs in fibrous consumption, to name no more.

These have been for years used as practical physical signs of the progress of the disease, and as points *d'appui* for patients to work from. For example, they can work to get them out, and do get them out by the food plans named. When they reappear, it is sure proof, nine cases out of ten, that lapses in diet have occurred, as they are quite sure to go when the diet is maintained. These clinical tests are to me irrefutable. I am sure it is a nice way for the doctor to know just how the necrosis is going on, and how to stop it, as I have done, am doing, and expect to do as long as I practice medicine. I hope you will follow in this.

I am aware that some will say that this is contrary to the conventional experience of the profession, but I say it is none the less true. Being true, it is right; being right, I am in a majority, as to be right is to be in a majority. Remember, my son, again, that your business is to cure if you can, and not to cure when you can is criminal. Hence, bacteriology does not present now to you the salient features you need for your work.

Item 11. Bacteriology does not use the morphology of the urine as a test of the condition of patients in consumption; Salisbury does. He aims to get the urine like a healthy babe's, nursing a healthy mother's breast—*i. e.*, clear as champagne, 1010 to 1020 specific gravity, free from odor, no deposit on cooling. You and I have done this, too. Deviations from this standard show something wrong with the kidneys, liver, digestion or nervous system. Testing with nitric acid helps out in showing biliousness. (See A—1; B—1, *Bibl.*)

Item 12. Bacteriology makes little account of the morphology of the skin. Salisbury does, and traces the vegetations of the skin. In consumption, no patient is cured before they have long disappeared. See *Morphology of the Skin*, A—1; B—1, *Bibliography*.)

Item 13. Bacteriology does not tell how to feed in consumption; Salisbury does. (See A—1; B—3 and 13, *Bibl.*)

Item 14. Bacteriology points out no medicine, but is hard at work to find a bacillus or agent to kill the bacillus of Koch. The Salisbury plans point out the use of medicines as follows: (1) As oils to the machine. (2) Tonics to tone up the glands and system. (3) Digestives to help digest the food. (4) To meet complications, as hemoptysis, diarrhœa, etc. (5) To put the skin in good order. (6) Hot water as a medicine to promote downward peristalsis—wash out, thin the blood, etc. (See B—20, *Bibliog.*) (7) *Food as a Medicine.* See Numbers A—1; B—3 and 13, *Bibl.*). (8) The having all medicines pure and up to standard, and testing all food preparations on one's own self before offering them to patients.

Item 15. To study bacteriology, one needs a laboratory, much time, special care, and instruments to practice with. The Salisbury plans, you know, need but a few things, though they must be of the best quality; and the results are at once manifest. I have thought they were like agriculture, which furnishes a field large enough for the exercise of capacities of the grandest and noblest, when provided with all that could be suggested in the way of mechanical, chemical and financial contrivance. And, on the other hand, agriculture may be successfully handled by farmers poor in resource, invention and ability. Any one who will live on baked beans, oatmeal, or army biscuit, exclusively, for three months (See A—1, Bibl.), whether he can use the microscope or not, will have some decided opinions on the subject. Facts are more than opinions not based on facts.

Finally, my son, have pity on the sick and dying. Try to give honor to whom honor is due. Abate not one jot, but do not honor only people for doing things that are halfway procedures, when you know of, and can testify to procedures which cover the whole ground, and save lives which the others cannot save. Sincerely your father,

EPHRAIM CUTTER.

New York, The Ariston, Broadway and 55th street.
September 18, 1888.

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20. *Diphtheria; Its Cause and Treatment.* G. A. Davis, Detroit. 3 plates of illustrations. 1884.

(B.) BY EPHRAIM CUTTER, M. D., A. M., LL. D.

1. *Partial Syllabic Lists of the Clinical Morphologies of the Blood, Sputum, Feces, Skin. Urine, Vomitus. Foods, including Potable Waters, Ice and the Air, and the Clothing.* (*After Salisbury.*) 8vo. pp., xviii—81. Published by Author. New York, 1730 Broadway. 1888.

2. *A New Clinical Microscope.* Bost. Jour. Chem., April, 1869.

3. *Treatment of Consumption by Animal Food.* Ditto., January, 1875.

4. *Food as a Medicine in Uterine Fibroids.* Amer. Jour. Obstet., Oct., 1877.

5. *Food as a Medicine in Agalaxia.* Ditto., April, 1878.

6. *Microphotographs of Mammalian and Consumptive Blood, taken with the 1-5, 1-10, 1-16, 1-50, and 1-75-inch Objectives.* By Dr. E. Cutter and Dr. G. B. Harriman. Exhibited at the Centennial of 1876, and copies placed at Yale College Library and Societe Belge de Microscopie, at Brussels, Belgium.

7. *Morphology of Diseased Blood.* Southern Clinic, March, 1879.

8. *Hog Cholera; Its Cause Known.* The Western Rural, March, 1879.

9. *Rhizopods as a Cause of Disease.* Virginia Medical Monthly, Nov., 1879.

10. *A New Sign of the Pre-Embolic State.* Chicago Medical Journal, February, 1879.

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12. *Tolles' 1-75th-inch Objective; Its History, Uses and Construction.* Amer. Jour. Sci. and Arts, New Haven, August, 1879. Scientific Amer., Supplement, September, 1879. Journal de Micrographie, Paris, 1879.

13. *The Salisbury Plans in Consumption.* Boston Journal of Chemistry, November, 1879. Also other papers on same subject, Michigan Med. News, November, 1879; Virginia Med. Monthly, December, 1879; Michigan Med. News, August 10, 1880; Transactions American Medical Association, 1880, Production in Animals, Rationale, etc., seventy cases, illustrated.

14. *The Morphology of Syphilitic Blood.* Amer. Jour. Den. Sci., Nov., 1878.

15. *Food as an Æsthetic, Chemic, Kinetic and Pathologic.* Amer. Jour. Den. Sci., January and February, 1880.

16. *Nervousness. Food and Divorce.* Ther. Gaz., August, 1880.

17. *Throat Syphilis and Tubercle According to Salisbury.* Amer. Laryn. Asso., 1880; Archives of Laryngology, December, 1880.

18. *Food; An Open Letter to J. Marion Sims, M. D., LL. D.*, and published by him in Gaillard's Journal, February, 1881.

19. *Tubercle Parasite.* Amer. Med. Weekly—Gaillard's—May 27, 1882.

20. *Therapeutical Drinking of Hot Water.* Amer. Med. Weekly, June 8, 1883; Druggist's Circular, August, 1883; London Lancet, September 15, 1883; Journal de Hygiene, Paris, October 26, 1883; Scientific American, Ther. Gaz., Constitutionelle Paris, et Aliis.

21. *Diagnosis of Consumption by Means of the Microscope, with Reference to Life Insurance.* N. Y. Medico-Legal Society, Medico-Legal Jour., June, 1886.

22. *Primer Clinical Microscope.* 1879. The Author.

23. *Micrographic Contribution to the Vegetable Nature of Croup.* Proc. Amer. Soc. of Microscopists, August, 1882.

ANSWER, BY JOHN ASHBURTON CUTTER, M. D., B. S., ETC.

Your letter of encouragement, information and commendation came to hand at a time when needed, to-wit: An old case of consumption, formerly under your care, had just had a pull back characterized by hemoptysis, hectic fever, sweats, etc., but of this more further on. You certainly are opposed to the conventional ideas of the day as to phthisis,

but when I consider that you have been working in microscopy since 1850, and the practice of medicine since 1856; that you have positively cured cases of consumption, some of whom are alive to-day, after fifteen or twenty years' lapse since leaving your hands, and that these same food plans have helped me with cases, called by my honored and honorable teachers of the Faculty of my medical *Alma Mater*, incurable, I do not wonder that you are willing and anxious to inform me further as to food *vs.* bacilli in consumption. When I was a boy, preparing for college, you gave up a large country practice, moved to Cambridge, and entered into the work of microphotography with great zeal. There was no money in it—instead, money out. But, if it is any satisfaction to you, I will say, that in all my medical studies, I have not come across any thing as to the etiology, diagnosis, and a means of watching a case carefully in the treatment of phthisis, which has been of so much value to me as the results of your efforts in microphotography. The plates are unique, elegant, clear, and tell their own story. I can only hope that they may be published as fully as Dr. Koch's researches have been.

This is not saying that the plates in Dr. Salisbury's monumental work, "The Relation of Alimentation and Disease," are not of value. Instead, they are of the greatest benefit. The only difference between his original work and your corroborative is, that he, a superb artist, made representations of morphology by the hand, and yours were made with instruments.

Again, as to conventionality, my associates wonder that I do not stain bacilli, etc. You and Dr. Salisbury say that there is no time to be used in staining bacilli, but to look for the forms without using any reagents. In your clinical morphologies after Salisbury, I find in the partial syllabic list of the sputum, about 120 forms indicated; as some of the units of the number are only classifications of many forms, the total would run up in the hundreds, and I am compelled to take no time for staining, but see all I can, aided by a good Tolles' microscope.

I am confronted by some who say that you are a "Salis-

bury quack," because you prescribe beef and hot water; one young man admitted that Dr. Salisbury could cure chronic diseases, but the feeling seems to be, that it is a poor plan to use about the same diet for many diseases besides consumption. If these gentlemen would examine "The Relation of Alimentation and Disease," they would find that there can be used as great, if not greater, delicacy in the prescribing of foods as any therapeutist would want. I will not speak here of your own work in drugs and chemicals, but will only state that my personal intercourse with Dr. Salisbury has shown him to be a man of far-reaching knowledge in the use of drugs. This can be substantiated by the examination of Dr. Salisbury's work with menthol, years ago; his chemical analyses in the '40's and '50's, under New York State Government observation, and his medico-legal expert testimonies at about the same time.

Salisbury began the study of Germ Diseases in 1849; you commenced the use of the microscope in 1850. He has worked originally in consumption, rheumatism, fibræmia, thrombosis, embolism, anæmia, syphilis, eczema, scrofula, malaria, variola, vaccina, typhoid fever, scarlet fever, diphtheria, fatty degeneration, cholesteræmia, carbuncle, leucocythæmia, measles, chronic diarrhœa, etc., etc., and you have also worked tremendously in corroboration, and in other lines originally. That you gentlemen have got all the truth, you do not claim, but, instead, invite all to come in and solve the problems which have vexed and are vexing the medical profession. You have had little recognition, though Salisbury's and my *Alma Mater* honored itself and him by granting him a prize for his essay on "Malaria." Your simile as to agriculture comes forcibly to me, as you sent me to the Massachusetts Agricultural College to get the scientific training given there, instead of the more literary like which you received in the academics at Yale. *These morphologies can be used without great expense.* You carry in your Cutter clinical microscope a Tolles' ¼-inch objective, for which you paid nearly one hundred dollars. After much solicitation by you, Mr. Tolles made cheaper objectives, one of which (a one-fourth) I carry in my clinical

microscope, and which cost only fifteen dollars. Dr. Salisbury and you pronounce it a good objective, for it does the work needed satisfactorily. The same can be said of Tolles' one-inch objectives. It would, of course, be very nice if I had microscopes and objectives like your superb collection, but that collection was necessary for you to show to the medical world that you were thoroughly in earnest, and used the finest instruments of precision then and now in existence.

It is not out of the way to state that in your microphotography, you devised a clinical microscope, costing but a few dollars, with which you took microphotographs, with the finest objectives, except the 1-75th. Here is another debt of gratitude I now gladly pay in small part, by my very earnest thanks, for your invention of clinical microscopes, one of which I have used with ease, despatch and precision, in dispensary (See "Some Facts Regarding Medical Missions and the International Medical Missionary Society," J. A. Cutter, M. D., Albany Med. Annals, May, 1888,) and private practice, in *diagnosticating pre-tuberculosis, tuberculosis, rheumatism, fibrosis, malaria, syphilis, cholesteræmia, anæmia, etc., etc.* I usually take this microscope in my hand-bag with scarificator, but have fastened it in a package with scarificator, behind a saddle, with absolutely no harm to the instrument; it is only necessary to see that every part is screwed tight.

But the trouble seems to be with these so-called Salisbury plans, as to their general adoption, that: *First*, Medical men condemn them *in toto*, as a professor did, who said to me that there was no such thing as tuberculous blood. "Are you willing to put yourself on record as to that, sir? Have you studied the morphologies of the blood, sputum, feces, skin, urine, vomitus and foods for many years?" He replied that he hadn't, and hesitated after all as to putting himself on record as to his belief that there was no such thing as tuberculous blood. He then asked for proofs of these things. I called his attention to some of the work done and published, of which I find more in your bibliography, that there were the records of cases, and that I had shown him the

proofs, and if he could not disprove them and would not believe them, I could do no more.

The *second* cause of the non-acceptance generally of these plans is: Physicians take a case of consumption and endeavor to treat it without any knowledge whatsoever of these clinical morphologies. I know you say that the ignorant may prescribe hot water and beef and cure diseases; but they fail often, as they cannot meet complications which a knowledge of these morphologies allows one to do; neither can they really start the case intelligently as to the use of adjuvants, medicines—oils for the machine, as you call them. Moreover, no one will ever cure every case that comes along, as you say, and if they lose the first case the treatment is condemned. Again, to put a patient on rigid diet, with the baths, medicines, etc., used, needs a physician whose patience must be great and who can look ahead for future results, for the road is often dark, and the patient despairs; if the physician cannot give encouragment the case will die. Here is another precept that I must thank you for: "That people want a physician when they are sick, and that he is not to come to them and tell them to get ready to die because their appearance is bad, but instead to encourage them to get well." While doing all one can with medicine, it is my personal experience that the use of these so-called "Salisbury plans" is a very hard matter, and no physician can be too well trained for the practice of them.

As a young man with the world before me, I have given in this answer some of the reasons for my faith, and can truly say that this faith is not without works, and that I have achieved ends in the short time that I have practised medicine which my medical *alma mater* (an institution requiring three years of graded work for a diploma), never gave me the hope of reaching. I append a few case histories:

Case 1. In May, 1887, I was called from the Dispensary to see an old man living in one of the large tenement houses of New York. He was over sixty years of age, had been a longshoreman and was suffering from prostration, sweats and cough; slept but little. His blood showed the red cor-

puscles to be strongly massed together, fibrin filaments visible in abundance, and also vinegar yeast in masses. I do not remember all of the morphological features, but I made a diagnosis of tuberculosis and ordered the old man to eat all the animal food he could get, beef, tripe, etc. (cooked, of course), to drink hot water four times a day, to use ammonia sponge baths and, gave him a tonic of cinchona, nux vomica and some of the fluid extracts. I was in such a hurry that day that I did not examine his chest, but sent my assistant, Dr. H. A. Minassion, a graduate of an Armenian medical college, and also of Bellevue, to see him later, and he returned with the diagnosis of tuberculosis, and that the disease involved the upper part of the left lung. The old man stuck faithfully to what had been ordered, and greatly to Dr. Minassion's surprise, and somewhat to my own, as his surroundings were not of the best kind, he improved very much, and in August the lung lesion had nearly disappeared. In September I was called to see him, and found that he had been sick several days; had caught cold by sleeping next to an open window. A pneumonitis developed in the lower half of the left lung, and, despite all I could do, he died in a few days. He was a Catholic, or I should have made an autopsy to see how much of healed tissue there was in the upper part of the lung. (Dr. J. Solis Cohen once told me that he had seen one of Dr. Salisbury's cured cases, in whom there had been an immense amount of disease, and in whose lung were now cavities thoroughly cicatrized).

Case 2. Dr. ——— came to see you in April, 1887, about studying these clinical morphologies in the American Institute of Micrology, but for certain reasons he did not make arrangements to commence studying then, and I invited him to come and see actual morphological work on consumption, syphilis, rheumatism, etc., in dispensary practice. This he did to quite an extent, and in the fall wished me to take charge of a case in Massachusetts of consumption, which he considered was incurable, as there were cavities present, so diagnosticated by himself and an older physician. I was to take charge of the case till he bought a microscope. This I did, receiving almost daily specimens of urine, feces and sputum. The patient, a young man of good education, being a graduate of Amherst College, was married, somewhat short of funds, and had a great deal to worry him. He had not been told of his condition, but of which I speedily informed him. He went on to close diet, with tonics, ammonia baths and hot water, and soon was eating four pounds

of meat a day. In January, 1888, Dr. ——— took charge of him. The case had its ups and downs. In May or June Dr. ——— wrote me that he had not been doing so well, and that he thought he was going to die, as his surroundings were too much for him. "But if he dies, I am fully convinced that these plans have done him much good," he added. But he improved again, and the last I heard of him was that he had come to New York and called to see me, presenting the appearance of health. This case may die yet, as I am more convinced every day that patients should be under observation for at least two years, to get, as Salisbury says, confirmed healthy tendencies and nerve action, and remove bad psychical conditions, inherited and acquired.

Case 3. June 12, 1888, I examined a young lady of 25, whose mother and a brother had died of consumption. She had been sick in the spring of what was called apoplexy. The red blood corpuscles were pale in color, diminished in number and ropy and sticky, so that they huddled together in masses. White blood corpuscles contained yeast spores, and in the serum were seen the mycoderma aceti free and in collects, beautiful crystals of cystin and uric acid and free fat. Urine was bilious, contained no albumen or sugar, but some fatty epithelia were found with the microscope. She was so fleshy (weighing 248 pounds) that a satisfactory examination of the heart could not be made, but the diagnosis was pretuberculosis, latent rheumatism and obesity. She was put on the rigid plans of diet laid down in pages 122–126, "The Relation of Alimentation and Disease," [Salisbury] eating only the foods therein prescribed, using as medicines 1-20 gr. strychnia before meals, and five to ten gr. salicin after meals; biniodide of mercury, 1-16 of a gr. with hot water, ammonia baths, etc. There was great aversion to the hot water and meats, but the blood morphology became gradually that of health, except when she ate forbidden food, when the microscope would unerringly detect the lapse in diet by the presence of the acetic acid plants in blood. She has had many pull-backs due to overwork and exercise, bringing her to bed with cold hands, feet and legs, pulseless wrists, pain in heart, head full of blood and pupils contracted, necessitating leeching or cupping. Hoffman's anodyne with chloroform used. Malaria has also been diagnosticated by the presence of the gemiasma verdans in blood, and removed by alteratives, salicin and quinine, the latter used very cautiously. She has now lost nearly sixty pounds of

weight, and owns a heart, which beats with more ease and precision. Case in progress. The main point in this case is the detection and removal of the pretubercular blood morphology, both of which were done with ease and dispatch.

Case 4. A beautiful young girl of 18, whom I first examined May 15, 1888, complained of great nervousness and of inability to do all she wanted to do. She said: "I feel now while sitting in this chair as if I could not walk across this room, I am so tired." Her parents were wealthy and she had all that life could give. Her red blood corpuscles were pale in color, much diminished in number and adhered together in masses. White blood corpuscles increased in number. Serum showed fibrin and yeast. Diagnosis by blood examination, anæmia and pretuberculosis, first stage. She had been eating ice for a year; craved it, and had been told by her family physician, when informed of her desire, to eat all she wanted. This gentleman, a medical professor, had never examined her urine, but instead had contented himself with giving her a tonic once in a while. Her urine had a specific gravity of 1032, and careful and repeated tests with freshly made Fehling's solution, brought invariably a deposit of sub-oxide of copper. No albumen; oxalate of lime, triple phosphates and granular salts present. May 28 she went on to the rigid plans as laid down in pages 127–132, "The Relation of Alimentation and Disease," [Salisbury] with the exception that she did not drink the beef tea. The regimen was hard, but in a few days, despite the drinks of hot water, the amount of urine passed was but three pints daily, and in one week's time the sugar disappeared. She was importunate for bread, and was allowed two mouthfuls at a meal. Diarrhœa came on, but was controlled by salicin. In four days the sugar returned. She was again put on rigid diet, *i. e.* no bread. Sugar again disappeared, and this time she kept longer on close diet. At the end of ten days she was allowed a little bread, and at the close of one month's treatment the sugar had not returned; the red blood corpuscles had increased in number, their color was brighter, the pretubercular elements had been starved out, and she felt that she needed no more treatment. Since the close of the treatment she has been in better health than for years, is no longer tired or nervous, craves no ice, and is thoroughly enjoying life. She may need further treatment, for I never believed that one month of dieting and medication would do what it did for her. But the facts are as stated, and are of great encouragement to me.

Case 5. In May, 1887, Mrs. ——— came to stay with us in New York to be under your care for one month for tuberculosis. Her father and a sister had died in 1872 and 1879, respectively, of fibrous consumption. You had cured her uncle of tuberculosis. She had been in poor health since 1879. Was married in 1881, and had borne two children. You found lung fibers in her sputum, an enlarged heart and tuberculous blood. Also an engorged, enlarged and misplaced womb, which was causing many reflex symptoms. The focus of disease (tuberculous) was through the middle, or just above the middle, of the left lung from before to behind. You treated her so that in one month's time the morphology of the blood became healthy; the cough ceased, the heart was beating normally, the uterine soreness and lesions had disappeared, and she went home a marvel to her friends and relatives, who had expected her to return from New York a corpse. You pressed on her the importance of remembering that she had done with her great resiliency what it usually took one year to do. In July you saw her at her home and fitted one of your stem pessaries to the womb, which she wore for four days, but by some exceedingly unfortunate accident the disc got out of place, and the pessary had to be removed. As she was nearly one thousand miles from you, she had to content herself with other measures you prescribed. During the latter part of the summer indifferent beef gave her diarrhœa, and unavoidable family trouble made such a strain on her life forces, that she began to run down, though closely watched by you, by the study of specimens sent by mail; and in November, 1887, she came back to New York with her lung in about the same condition as before. From a cold caught on sleeping car she had an attack of congestion of lungs. She stayed with with us into January, when she felt it necessary to go home, her lung now being again healed, though the uterine lesion was not in a condition to satisfy you. On reaching home that satanic spirit, which often infects servants, contaminated hers, and she was obliged to go into the kitchen and cook, with the result of another attack of congestion of lungs, followed by rheumatism. She became better, and one day while driving, her son, a boy of five, had to get out to pick up something lost in the road, and the horse becoming scared necessitated her pulling the boy into the carriage. In about two hours sharp pains came on in the womb, which were not relieved till she had used iodoform per vaginam and morphine by the mouth. All these things

you doubtless remember. *May* 12*th* I came to make her a visit, and found her blood somewhat ropy, with some yeast present. She was then cooking, as no servant could be obtained. Did not feel well. As I was very tired, I did not examine her then for uterine trouble, for which I was very sorry afterwards. For in a few days she tuned up with cerebro-spinal meningitis, characterized by chills in back, fever, dry skin, vomiting, rapid respiration, contracted pupils, headache and delirium. I tried the much-lauded morphine treatment, with the result that she got worse Arguing that there was pressure on the base of the brain, I put two leeches on the side of head, and she became quiet, the skin moist and cool, the vomiting ceased, the pupils relaxed, the respiration normal and a natural sleep followed. But it was necessary to follow this up with more leeches, forty grains of calomel and small doses of bi-sulphate of quinine. She progressed slowly and steadily. The womb was enlarged and displaced at times—forward, then backwards, and at other times prolapsed. This last state must have been from the wrench received when pulling the boy into the carriage. She turned completely against beef, and ate fish, oysters, game and eggs against my earnest protest, as the blood morphology would not remain healthy. At times the uterine trouble would improve; but in September, finding that the cough was increasing, lung-fiber was appearing in the sputum, and the lung was giving evidence of necrosis in the same place as before, I had one of your Cutter No. 2 batteries made, of 8 plates of carbon, 8x1½x¼ inches, and 8 plates of zinc, 8x1½x⅛ inches. These were put in one pile, the zincs connected together, and the carbons in the same way. The battery was finished September 15th. She had in the meanwhile been on closer diet, eating beef, with some bread, but not enough of the former. And the date just noted she had a hemoptysis at 7:30, A. M , of about four ounces. I was away at the time. Another hemorrhage followed in the afternoon, but soon after I had obtained medicines, and gave her bugle-weed and witch-hazel internally, using the persulphate of iron locally by spray. Hectic fever and sweats came on; large masses of lung-fiber were coughed up. She came down to close animal food diet; acid baths, with salicin, were used. There was crackling in the front of the left lung, and in the back could be heard the air bubbling amongst mucus in a cavity. But she has been making steady progress; the fevers and sweats ceased in five days. The lung has been, and is, healing. So to-

day, four weeks from the time of these hemoptyses, there is no crackling in front, and behind the lung can be heard but a little rasping. This is marvellous, but is true to life. The uterine lesions have steadily improved since I have used the galvanic current from the battery. The plates submerged to one-half their length in the electropoin fluid. Two tablespoons were used as electrodes—the zinc electrode against the vulva, the other above pubis. One to one and a half minutes of passage of current. In fact, I find that it is better for me to take an electrode in one hand, and place the other hand above pubis. This current is painless, but relieves soreness and is reducing engorgement.

When I consider that twice has her lung been healed, and is now for the third time going through the same process, I feel the truth of what Dr. Salisbury has said, and what you have written upon, "food is an agent of tremendous power."

If she will stick to the diet, I believe she will get entirely well, as now her surroundings are such that there is every opportunity for her to do nothing but eat, drink and lay down new tissues.

I remain, with great respect, your grateful son,

JOHN ASHBURTON CUTTER.

Lynwood Stock-Farm, Harrod's Creek, Ky., Oct. 13, 1888.

NOTE.—Case 5 did well for a time after the above answer was written, but malaria was so abundant in her neighborhood that it was deemed necessary to change her climate, and November 8 I brought her to New York, where she will stay for six months, or until she is in a condition that fully satisfies us. To-day she can walk longer distances than she has been able for eight months previously to accomplish, and little resembles the very sick woman she was in September.—J. A. CUTTER, The Ariston, &c., Dec. 1, 1888.

American Institute of Micrology.

MEDICAL DEPARTMENT OF INSTRUCTION.

EPHRAIM CUTTER, M. D., LL. D., HON. F. S. Sc. (LOND), PRINCIPAL.
JOHN ASHBURTON CUTTER, M. D., B. Sc., ASSISTANT.

The Ariston, Broadway and 55th Street, New York.

SYLLABUS.

LESSON 1.—Principles of Microscopical Investigation; Studies of the Hairs of Man and Plants.

LESSON 2.—Biology and Morphology of Algæ; Diatoms; Desmids; Zygnemaceæ.

LESSON 3.—Oedogoniums: Saprolegniæ; Oscillatoriaceæ.

LESSON 4.—Bacteriaceæ; Vibriones.

LESSON 5.—Protococcaceæ; Palmellaceæ.

LESSON 6.—Biology and Morphology of Fungi; Yeast; Vinegar Yeast.

LESSON 7.—Protoplasms; Amœbæ; Infusoria; Rhizopods; Asthmatos Ciliaris.

LESSON 8.—Morphology of Food and Cooking; Bread; Infants' Foods; Drinking Waters.

LESSON 9.—Morphology of Dirt.

LESSON 10.—Morphology of Air.

LESSON 11.—Morphology of Urine.

LESSON 12.—Morphology of Fæces.

LESSON 13.—Morphology of Sputa.

LESSON 14.—Clinical Morphology of the Skin.

LESSON 15.—Morphology of the Blood in Health.

LESSONS 16 and 17.—Morphology of the Blood in Consumption.

LESSON 18.—Morphology of the Blood in Syphilis.

LESSON 19.—Morphology of the Blood in Rheumatism.

LESSON 20.—Review.

Lessons One Hour Each. *Terms on Application.*

It is not intended for the physician to master these, but to obtain some practical ideas of them. Men may deal practically with potatoes, knowing nothing of their botany, and yet be good farmers. So may it be with the botany of disease. Medical practitioners can know enough to detect and destroy the parasites found in syphilis and consumption. Thus they will be qualified to express opinions as to the value of the microscope as a tool of precision in the diagnosis and treatment of these diseases.

TEXT-BOOKS: Micrographic Dictionary, *Griffith* and *Henfrey;* Primer of the Clinical Microscope, and the Clinical Morphologies of the Blood, Sputum, Urine, Fæces, Skin, Air, Food, including Potable Waters—*Cutter*

☞*Address as Above.*

ON THE DEATH

—OF A—

Cured Case of Tuberculosis Pulmonalis.

By JOHN ASHBURTON CUTTER, M. D., B. Sc.,
OF NEW YORK CITY.

[Reprinted from the VIRGINIA MEDICAL MONTHLY for September, 1889.]

In the December number for 1888, of the *Virginia Medical Monthly*, appeared an article entitled, "Food versus Bacilli in Consumption (opus 286). An open letter from Ephraim Cutter, M. D., LL. D., to his son John Ashburton Cutter, M. D., etc., with Answer."

As the history of Case 5 given in my answer has recently terminated in death, I feel that those that read the article in question should have the privilege of reading the full account of this patient's life and death.

In May, 1887, Mrs. ———, aged 25, came to New York to go under our care. Her blood was tuberculous; the sputum had lung fibres and she was also suffering from an enlarged and engorged womb; the heart was hypertrophied. In one month of careful dieting and medication, her cough had disappeared, the lung gave evidence of healing, the blood morphology had become healthy, the heart beat easier, and the womb was reduced to normal size. She was urged to stay with us, but the understanding was when she left home that she should return in one month. Her case had shown unusual progress, and the importance of remembering that she had done with her great resiliency more in a

month than we usually accomplished in six, was told to her. (Her father and a sister had died of tubercle in 1872 and 1879, respectively; a paternal uncle, was a cured case of pre-tuberculosis, accomplished in 1878; hence her treatment by us.)

In July, my father saw her at her home in the West and applied a stem pessary to her womb; this she wore with comfort for four days, when driving in a carriage, the disc became displaced and she had to take away the instrument. During the summer she did fairly well; had been ordered to take much outdoor exercise; this she over-did; (there is such a thing as patients playing too hard as well as working too hard.) Again, the latter part of the summer unavoidable family troubles came up which worried her, and indifferent beef gave her diarrhœa, so that in the fall she had commenced to run down again. The middle of November, 1887, arrangements were completed for her to return to New York, which she did, *travelling alone;* she caught cold on the sleeping-car and had an attack of congestion of the lungs on arriving here; this set her back. Still she pulled out all right, and in January made up her mind to go home.

To judge of her condition, let me say that a few days before leaving, she walked with me to the top of the Metropolitan Opera House climbing over one hundred steps, so that she might hear little Josef Hoffman play. She was in good flesh; no cough. On reaching her home, she walked nearly a mile over an icy road up hill to her house *without fatigue.*

All went well for a while till her cook left her; then ensued a great deal of trouble in getting help; the patient had to go into the kitchen and cook for seven farm hands besides her family; I say, *had* to go into the kitchen; this is hardly the truth. The patient was a woman of fine family; her father had occupied the first position in his profession; her mother was highly cultivated and she (the patient) possessed one of those exquisite nervous systems that brooked at no delay; she loved to carry on her household with the utmost precision and with comfort to her family; indeed when her first child was in utero she had for one summer a household of seventeen which she managed successfully. Her husband was deeply engrossed in the laborious occupation of handling a large stock farm, with an extensive and expensive plant of full-blood cattle and the apparatus needed on such a place. Neither he nor she realized the suicidal

result of her working over a hot stove; so she in her great desire to keep things running smoothly, did the work she ought not to have done. If any one thinks cooking is easy work and comfortable, let him or her work over a hot stove and see how soon the head becomes heated. The first result of this cooking was an attack of congestion of the lung—the right one this time, not the left which was the one which had been implicated with tubercle. She then asked her attending physician to examine the left lung; this he did and pronounced it healthy. She came out from this attack of congestion, and later in the spring while driving, her boy, aged five years, had to get out of the carriage. While he was climbing in, the horse started and she pulled her son in by one hand and severely wrenched herself in the pelvic region, so that sharp pains came on in the womb; these were relieved by opium and iodoform per vaginam.

In May, 1888, I came to visit her after attending the meeting of the American Medical Association at Cincinnati. She was then without a servant and was cooking; did not feel well; was tired; had much pain in the top of the head; blood not normal and had some yeast present in spores, free and in masses. Five days later she was taken sick with chills in back, fever, rapid respiration, contracted pupils, vomiting, partial opisthotonos, headache and delirium. I tried the much lauded morphine treatment with the result that she grew worse; then applied leeches to the side of the head and purged her with forty grains of calomel; small doses of bisulphate quinine. These brought about healthy action, but the mischief had been done and we entered in on a race with Death in which he finally came out ahead.

From a cheery, bright, hopeful person she became irritable, despondent and at times distrustful of her friends. It seemed as if all the good work that had been done by her and her physicians was thoroughly undone. She convalesced slowly. Her nervous system was so upset that she hated beef. We fed her with oysters, chicken, cream, milk warm from the cow, fish, etc. I made up my mind to stay with her and follow up the case closely. In August the cough began to slowly come back; increased, and despite my protestations and urgings that she live as she had done before on beef alone, the poor sick woman was so shattered by the meningitis that she could not. Moreover, the womb, which had before this been only enlarged and displaced forwards or backwards, was prolapsed more or less at times, and there can be no doubt that the wrench received

when she pulled the boy into the carriage had hurt her much. In September, the lung fibres began to appear in the sputum, and on the 15th of that month she had four hæmoptyses; they were finally controlled by the atomization of liquor persulphate of iron, one part to sixty-four of water, and the use of bugle weed and witch hazel internally; she again took to bed; said she was going to die; hectic fever came on; bright spots on cheeks; skin cold and sweaty; pulse 120. I felt the case was desperate and despite her prognostications of death, finally encouraged her so that she came down to close beef diet, broiled; (it makes me angry when educated physicians ask, "How do you do so much with raw beef?" The answer is, that "I never prescribe raw beef; do not care about filling up my patients with tape worms or giving them an extra job of digestion which proper cooking will accomplish.") For her cold skin and its sweaty condition, I used acid baths with salicin. There was crackling in the front of the left lung, and in the back could be heard the air bubbling amongst the mucus in a cavity. At this time I also used the primary current from a galvanic battery, in very small doses for the womb. It was truly wonderful to see how that woman's case improved on her close diet. In one week's time she was out of bed; was soon out driving; the sweats stopped and the cough greatly diminished.

But the latter part of October, she was so much depressed by the malaria that was present, that I decided to make a change of climate, and on the 8th of November I took her to New York. The malaria, of course, was left behind and she improved. A few weeks before Christmas, she decided that she would make up a box of presents for her little children. We feared not only the brain work of choice and the labor of needle work, but that the home associations which would be brought up by these presents would demoralize her. Remember that she was in our family, but instead of the bright happy woman she had been on her previous stays with us, she would at times give way to fits of despondency out of which it was very hard work to get her; would take her to places of amusement and try to occupy her mind as much as possible so that the introspection would be done away with. Our fears were fully realized; she had a very bad attack of homesickness, and her appetite for beef left her; we then gave her as much leeway as possible in her diet, with the result that the cough came back. The night sweats returned, the lung fibres again appeared in

her sputum, and the bright spots on the cheeks showed that Death was again making good time in the race. Christmas day was, perhaps, the most wretched one that this poor woman ever had. (Now I have been blamed for taking this patient away from her friends; it was called cruel, inhuman. Yet she went freely, as she knew that we were the only ones that had ever given her hope of getting well, and she had had evidence in the past that we had been able to do her good. Moreover, she was so situated that she could receive medical attention at any time.) That night I went into her room, and she said to me, "Doctor, I am going to put my appetite behind my back and eat the broiled chopped beef four times a day in my room; I do not want to see any other food." This was done and in four days she said to me, "That beef really begins to taste good to me." A few days after this she had an attack of congestion of the lower lobe of the left lung; this she speedily recovered from and her mother came on to be with her and keep away the homesickness. After the middle of January she never coughed again.

In September, 1888, I had noticed a swelling by her throat, said nothing about it, but later, when she began to complain of it, we examined and found that there was a well defined goitre; this would diminish and then increase, but after going on to rigid diet, it slowly disappeared and never bothered her any more.

March, 1889, she had a severe attack of pain in the left side, which extended up by the heart and down the arm. It puzzled us till we discovered at the sigmoid flexure of the colon a fibrous thickening of the bowel; the fæces were passed in small pieces, two inches long and half an inch wide, being flattened. Now this fibrous thickening was of the same nature as the excessive development of connective tissue in the thyroid gland before noticed. If the nutrition could be held on proper basis, nature in time would take it away as she had done with the goitre and as she had done in other cases of fibrous thickenings of the bowels. It must be remembered that such mal-developements in the bowels are of poorly vitalized tissue and very prone to pain. Here was a woman who had had her nervous system shattered by a meningitis, tuberculous if you so please to call it, and it makes my position only the stronger. Our indication was to keep her comfortable, her bowels open and her nutrition as near to a healthy basis as possible.

So she was fed on beef with a little vegetable food; her

bowels were kept open with small doses of chemically pure sulphate of soda and the pain was controlled as best as possible with sulphate of morphia under the skin. The first week in May, I took her with her mother and her little girl to the seashore at Buzzard's Bay, Massachusetts. Here she was doing quite well till the latter part of the month, when she became much worried over an unfortunate occurrence, and for three days about lost the balance of her mind; she was quieted with hyoscine; her husband came to her and it was decided that she had better return home and be with him. On the morning of the day we left, all went sailing and were caught in a lively squall of wind; this instead of frightening, brought her out of her melancholy.

I journeyed with her to Louisville; she was examined by Dr. W. W. Bolling, who told me that her lungs were softening in 1884 and that he considered the disease arrested.

Fourth of July, I received word that she would not live a week; so I made a hurried trip to Louisville and found that she had got upset and had lost ground. Her attending physician and I came to an understanding and I left her quite comfortable after a four days' stay. She rode out with me twice; the fibrous thickening at the sigmoid flexure was undoubtedly less than it had been since March. On my return home, she did well for two weeks; took less morphine; was easy in her mind; calm and trustful; but malaria attacked her and I still think there was some ptomaine poisoning from pepsin; at any rate, there came on an excessive fermentation, agonizing pain, and she gradually sank, dying on the 6th of August. Thus ended a brave life.

Conclusions.—1. This case had undoubtedly the tuberculous diathesis.

2. She had a fine mind, was of the nervous temperament and whatever she did, she did to the utmost of her ability, and at times wasted her life forces. Her mother often said to me, "Doctor, if my daughter is ever restored to health, she will wear herself out with work."

3. Some blame us for being so rigid in our dietary; they ask why do you not give milk, eggs, cream, fats, etc.? Now this woman tried a pretty liberal diet after the meningitis with the result that she had hemoptyses and her lung was only repaired by rigid diet. It makes no difference to us what we give our patients—we want to cure them; and if our

experience shows us that one food is better than another, we would be fools if we did not follow the indications. Many men criticise us for the way we handle consumption, but we look in vain for our critics to publish cases of cures *as well as the deaths*, as my father did in 1880 in the Transactions of the American Medical Association, in which he gave 70 cases, 27 of which were cures.

4. It takes nerve force to live; also to get well. This woman's lung was healed, in May, 1887, and in November, 1887; then came the terrible meningitis undoing everything; yet the lung was healed again in October after the hemoptyses, and when it broke down for the last time, in December, and she went on rigid diet, which she followed up closely to her death, cough ceased in January and was never heard again.

5. What evidence have I that her lung was healed, again and again? (*a.*) The examinations made at various times, the last in June, 1889, by my distinguished father, Dr. Ephraim Cutter. If any doubt his ability to make a correct diagnosis of lung lesions, then they must pass on the judgment of the Boylston prize committee of Harvard University, which in 1857, granted him a prize for his essay on "Under what Circumstances do the Usual Signs Furnished by Auscultation and Percussion prove Fallacious?" (*b.*) In February, 1888, she was examined by Dr. Beard, of Kentucky, who said her lung was healed. (*c.*) June, 1889, she was examined by Dr. Bolling, of Louisville, who gave the same testimony as before noted. (*d.*) Lastly my own, even if prejudiced (?) I was with her continuously from May, 1888, to June, 1889; saw her in the summer of 1888, when she could not live on the diet, go gradually down till the lungs necrosed; also witnessed the blood morphology peculiar to tuberculosis gradually increase till it was in its worst stage; I saw the blood morphology improved and become normal at the same time her lung did.

6. *If then this Case did not die of tuberculosis pulmonalis, what did she die of?*

Answer.—Though the lung was healed and bowel lesion was improved, she was simply so tired out with getting well

so many times and fighting the pain, that when upset by the malaria and perhaps the ptomaine poisoning, life was snuffed out as a candle is.

In closing, let me pay a tribute to the bravery of this woman, who even after shattered by a meningitis, still fought for life.

The Ariston, Broadway and Fifty-fifth Street.

Note.—Those who would like more reading on the cure of tuberculosis, will find some valuable information in the *Transactions* of the American Medical Association for 1880, pp. 339–408. Here are contributed the histories of seventy cases by my father; seventeen non-arrests; twenty-six temporary arrests, and twenty-seven arrests. It is my belief that any one who reads this remarkable set of cases—taking those that died with those that were cured, and the prelude that my father gives to the article in question, in which he says he considers that consumption is a *curable disease*—will say that we had good reasons to hold on to this case as we did. Moreover, I think those that blamed us for saying that this woman was curable, both practitioners of medicine and laymen, who also said that they knew all about the matter and that nothing could be done for her, will now think that perhaps they have not comprehended the whole subject, and before passing opinion on a matter with which they were not fully acquainted, they should have visited or corresponded with some of the cases of permanent arrest. As the history now stands, *my patient*, with whom I fought Death for months, is at rest; but the practitioner who says that her lung was not healed, and that tuberculosis is incurable, occupies a dangerous position, from the agnosticism of which I pray to be delivered, and trust when I am sick that I shall be treated by positive medicine, which is not afraid of death, but will use all its powers to comfort and cure me. J. A. C.

MALE NEURASTHENIA.

New Cause and Treatment—A Preliminary Report.

Presented to the Richmond Medical and Surgical Society, January 23d, 1890,

By EPHRAIM CUTTER, M. D.,

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[Reprinted from the VIRGINIA MEDICAL MONTHLY for February, 1890.]

Among the prolific and diverse labors of the late Dr. G. M. Beard, the fixing of the meaning of the term "neurasthenia" was a prominent one. The conventional nomenclature of the causes of death of the present day shows the results of his work. What else means the term "heart-failure" but a nervous prostration of that organ, as verified by *post-mortem* examinations, where no lesion of the heart is found to account for the sudden death? Apparently, all are satisfied with this terminology; but we think it is time to look further, and inquire into the causes of this *neurasthenia*. We know that it has been ably done, but we do not think that one causative lesion of it with which we have become familiar is well known; and, acting on the principle, that if any one knows, or thinks he knows, something new as to the cause and cure of disease, it is his duty to impart that knowledge, even though it should prove he is mistaken; this is writ.

Historical Matters.—Some thirty years ago the writer was Secretary of the Middlesex (Mass.) East District Medical Society, and, on being requested by me to do so, one of the members, Dr. —— ——, of ———, kindly stated his case to the Society, and asked for opinions and treatment. It dealt entirely with neurotic symptoms, which varied from time to time, and showed a lack of nerve force, without any organic disease, which could be detected. The case was a poser; no expression of opinion nor of treatment could be drawn from the members. The doctor himself was a bright, careful, intelligent observer; and his relation showed that he had skilfully treated himself up to the standard of the then present state of knowledge.

After a series of cases had been worked up for several years, on which this paper is based, Dr. ———'s case occurred to mind, and he gratified me by sending, at my request, seven one-ounce bottles of morning urine voided on seven successive days. These specimens, when subjected to physical exploration, *showed the presence of a protoplasmic or colloid discharge*, which, in other cases, had been to me a sufficient evidence of one cause of male neurasthenia, and which it is proposed to explain.

Morphological Evidence.—This physical sign is found in the morphology of the urine. (See the Clinical Morphologies, E. Cutter, New York, 1888, p. 45.) It is not that observers have not noticed this discharge; they have, still they have regarded it of no pathological significance. Where we differ from them is that *we do regard it* as a valuable diagnostic sign of the male neurasthenia. The way this difference of view came about was as follows: Since 1880, I have made a practice of studying the morphology of the urine of patients, *sometimes daily for weeks and months.* But coming upon neurotic cases, in which this colloid discharge was the only appreciable lesion, and finding that when such cases were treated and the catarrhal condition removed, they always improved, and so long as the patient would follow out the directions, the improvement continued,

I was led to take the position here given, and I feel convinced that this complaint is a very common one, occurring often in old and young business men and students who apparently are well, save that their complaints of irritability, pains, sometimes excruciating, making them express themselves in terms which appear, to those most interested about them, whimsical, nonsensical, or, as we used to say in our boyhood, "hypoey." And I might remark here that I now think that, if those cases I knew of in my boyhood, and were known to the whole community in which they dwelt as "hypoey," could have had the benefit of what is now understood, they would have passed from the opprobria which rested upon them by proving that there was a physical foundation for their condition, just as the women who had the same term applied to them in those days would have been relieved by finding some gynecological disease.

What to Look For.—In a case of male neurasthenia, which comes to you with a long story of aches, pains, weaknesses, and sufferings, which appears so momentous that you wonder how the sufferer could be alive, and of having want of confidence in the medical profession to discover the seat of his complaint or to relieve him. Usually there is a degree of self-confidence and positiveness of statement in his own conviction, which reminds us of the same qualities we find in our better-halves. You look the case all over carefully; no lesion is found to explain such a great departure from normal innervation. You examine the urine; it appears clear, amber-colored, of good specific gravity, normal odor, and all that is seen, if you allow it to stand over night, is a light protoplasmic cloud, occupying, sometimes, the whole of the lower half of the vial. You cannot tell by the naked eye the characters of this discharge. It is put under the microscope, and the deposit is not made up of triple phosphates or urates; but if you use (as you had better use) a one-inch objective—which is a good one, and the best are none too good—you will find, if the case is a typical one, collections of gluey (colloid) viscid matter, with no

extra amount of mucous corpuscles or mucous epithelial cells, moulded in shapes like Indian clubs, varying in color from white to a brown; then, if you look further, skeins of colloid matter, curled up in fanciful shapes, sometimes separated into single filaments, and sometimes filling the field so full of the Hogarth lines of beauty that you cannot help expressing your surprise, perhaps to the discomfort of your anxious patient. Besides this, the discharge is sometimes diffused through the urine in a light, fleecy, unorganized cloud, which it is somewhat difficult to recognize, unless one is familiar with protoplasmic studies. Although these three forms are sometimes found together, still they are often found separate, so that, in enumerating them, we speak, *first*, of the protoplasmic; *second*, of skeins; *third*, of Indian clubs. *Next*, you must examine *seven successive specimens of seven days, i. e.*, one of each day, the first urine voided on rising. It has not seemed justifiable, in a chronic case, to base the diagnosis on one examination. For example, spermatozoa may be normally discharged once or twice a month, and if you happen to get a specimen on the day of that normal discharge, it will be unwise to jump into the conclusion that the case is one of spermatorrhœa.

Spermatorrhœa, according to my experience of thirty-six years, is a rare disease, and the diagnosis of it is not complete unless the forms are found very much oftener than the normal discharge.

I may be wrong, but I do not consider the finding of the colloid secretion in one specimen evidence enough; it must be found in a majority of the discharges for the days of the week. When you study urine daily, you will find that it varies very much. For example, in the cases in question I have been very much surprised, in times past, to find them alternating on some days with albumen, casts of the kidney tubes, and fatty epithelia, which I regard as diagnostic of Bright's disease. It would be very interesting to enter in on the relationship of these two pathological conditions, but such a consideration must be deferred to the regular

paper. I am not an agnostic as to the curability of Bright's disease, for my son and I exhibited three cases of cure at Newport at the American Medical Association June, 1889. (See "Trophopathy in the Fatty and Fibroid Degenerations," *Dietetic Gazette*, December, 1889; *Medical Bulletin*, January, 1890; *Virginia Medical Monthly*, January, 1890, and other journals.) I will say, however, that the kinship is in the food consumed by the patient.

As to the Importance of this Form of Neurasthenia.—When first acquainted with this disease, I knew it was hard to bear, but did not think it was dangerous; but I have had patients die with it, and the autopsies showed no sufficient cause of death. The manner of going out was with a sudden failure of the heart as if there was not enough nerve force to run it; so I am led to take a more serious prognosis. The patients may live, like Dr. ———, for thirty years, and though he considers that his life has been prolonged by the disease, because it has made him careful, where he would have been careless, I believe there is danger, especially as the urine will alternate with albuminuria, fatty epithelia, and renal casts as before noted. This complaint is not due to sexual abuse, *i. e.*, as a sole cause; it is a food disease. The catarrh is mainly from the ducts of the prostate and spermatic glands.

Principles of Treatment.—The indications are to build up the system on food that does not ferment in the alimentary canal and paralyze different parts of the body which are the weakest. This is done by generally giving the patient one food from the animal kingdom and one food from the vegetable kingdom at a meal. Attention must be paid to digestion, some good tonic nervines, as strychnia, damiana, and phosphorus, sponge baths of ammonia and water used daily to restore the skin to good working condition. The urine must be examined often—at least once a week, better thrice. The patient must go on treatment for from six months to a year, and be carefully watched, to see when he gets his urine right that it stays right. We cannot give

here the full directions for diet and medication, as each case is a law unto itself, and must be worked up carefully and handled carefully. If the practitioner will do this, he will find himself rewarded, and his patient will be very grateful. We hope to amplify this more for the next meeting of the American Medical Association before the Committee of Dietetics.

"The Ariston," Broadway and Fifty-fifth St., New York.

TROPHOPATHY

IN THE

FATTY AND FIBROID DEGENERATIONS:

A JOINT PAPER

BY

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AND

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Read by the Junior Writer before the Section of Practice of Medicine, Materia Medica and Physiology of the American Medical Association, at its Fortieth Annual Meeting, 1889.

Published in full in "The Medical Bulletin," January, 1890; *the "Virginia Medical Monthly," Richmond, January*, 1890; *the "New England Medical Monthly," February*, 1890; *the "Southern Practitioner," February*, 1890; THE JOURNAL *of the American Medical Association, March*, 1890; *and in Abstract in the "Dietetic Gazette," December*, 1889, *and "The Doctor," September*, 1889.

NEW YORK:

THE ARISTON, BROADWAY AND FIFTY-FIFTH STREET.

1890.

TROPHOPATHY

IN THE

FATTY AND FIBROID DEGENERATIONS.

(THE FOLLOWING IS AN ABSTRACT)

THE animus of this contribution is the belief of the writers that *trophopathy* (*trophos*, food, *pathos*, disease) has more to do with the cause and cure of the so-called incurable diseases than the profession gives credit to; and to show that our belief is founded on facts, we will immediately proceed to the consideration of the subject in the concrete by the reading of some histories of patients that have been under our care:

CASE I. *Bright's Disease, Cirrhosis of the Liver, and Enlarged Heart.*—January, 1886, a man aged forty-six went under treatment for the troubles as noted in the heading. His case appeared entirely hopeless; but believing that a physician has never the right to act as a judge and condemn a man to death, his case was undertaken, with the happy result that to-day he is now in robust health, and would be present at this meeting if our letter notifying him of our desire that he should come here for your inspection had not miscarried. This man had full-fledged Bright's disease besides his other troubles; *we do not consider any case full-fledged Bright's disease unless there are in the urine albumin, casts, and fatty epithelia.* We are continually getting cases which may have any one or two of these three signs; such cases are hovering on the border line of health and well-marked disease, and are very amenable to treatment.

Such wavering from health would oftener be detected if physicians would make more thorough examinations of the urine; taking six specimens from six consecutive days, it is wonderful to see the variance from day to day.

CASE II. *Bright's Disease of Kidneys and perhaps of Lungs.*—The late Dr. Louis Elsberg went under the senior writer's care one year before his death, for full-fledged Bright's disease. He was dieted, but would take no medicine. The abnormal condition of the urine was changed to that of health. He was then warned that he must not eat all of the starches and sugars which are so often catered to our tastes; but the warning was disregarded, and the medical world knows how his life went out, as a candle is snuffed, by what was thought to be pneumonia, but perhaps was Bright's disease of the lungs.

CASE III. *Bright's Disease of Kidneys and Lungs; Improvement; Death on endeavoring to handle his own case.*—A millionaire was treated for two months and with much improvement; then, feeling too poor, he undertook the care of his case, ate wrongly, overworked, and was poisoned with sewer gas. The troubles came back with full force, and he died.

CASE IV. *Acute Fatty Degeneration of the Kidneys, Placenta, and Cerebral Blood Vessels.*—Primipara, 1880. Albumin, casts, and fatty epithelia were found in the urine. Placenta was covered with plates of cholesterin; rupture of cerebral blood vessels two days after delivery; convulsions for thirty-six hours; after the convulsions she was given beef tea *ad libitum*, and in a few days beefsteak broiled. She improved steadily; on the solicitation of her parents hop tea was allowed, but she needed no medicines beyond the *food medicine*. This was in 1880. She is well to-day and has borne two more children; the face, which was drawn to one side, is

even now. (See *N. E. Medical Monthly*, February, 1888, E. Cutter.)

Case V. *Fibrous Consumption, Bright's Disease, and small Fibroid Tumor of the Womb.*—Lady, middle-aged, went under treatment for the troubles just noted, with the result of cessation of cough, healing of lungs, disappearance of the morphological and chemical evidences of Bright's disease. The tumor has migrated, gone.

Case VI. 1886. *Bright's Disease.*—This case had an unusual number of casts and fatty epithelia in the urine, besides the albumin. Treated, cured and remains so.

Case VII. 1886. *Bright's Disease.*—Man, aged sixty. There was a disappearance of the evidences of his disease while under treatment; re-appearance occurred to a certain extent; June 18, 1889, there were no casts, no fatty epithelia, and but a trace of albumin in urine. Is treasurer of a great missionary society, and has a heavy responsibility to carry, besides doing much literary work.

Case VIII. 1877. *Bright's Disease. Cured. Remains so*, 1886.—It was decided to infuse blood into veins, but, on finding patient could eat tripe, was placed on it, and, the stomach accepting it, transfusion was postponed. It took two years to get her well; she ate tripe, beef, and drank milk warm from the cow.

Case IX. 1882. *A. B., aged twenty-four. Unmarried. Uterine Fibroid, interstitial, hard, investing the whole Womb and extending above the Navel.*—She followed the food directions faithfully, and was rewarded by the entire disappearance of the tumor. Gynecological agnostics who say when a case of fibroid tumor is reported as cured by galvanism or by food, or by both, "The cure was effected by the menopause," will not get much comfort from the history of this case, if it be a

comfort to them to know that their predictions of failure are at times realized.

CASE X. 1882. *Mr. ——, aged sixty. Fibroid of Stomach, with enlarged Liver.*—After hard work, and by nourishment per rectum, the patient's condition was so improved that he could take food by the mouth. He was cured, and remains so, 1889. He would be here to-day for inspection, if business did not prevent.

CASES XI., XII., and XIII. *All of Bright's disease*, 1879, 1881, *and* 1884. *Cases XI. and XII. aged about sixty years at time of treatment; Case XIII. aged twenty-four.*—All are cured and here to-day for inspection.

CASE XIV. 1876. *Woman, aged forty-two, sick in bed from grief at the death of her last surviving daughter; cardiac hypertrophy and insufficiency of left auriculo-ventricular valve; angina pectoris; four hard, marble-like tumors behind the uterus; severe stinging pain in pelvis; father died of cancer of the stomach.*—Patient was fed against the appetite with beef, with the following results: 1. Heart normal in size. 2. Valvular insufficiency hardly perceptible. 3. Angina pectoris gone. 4. Uterine disease relieved; tumors gone, uterus mobile, discharge normal. 5. Urine clear as champagne, 1.015–1.020 specific gravity; no odor; no deposit on cooling. 6. Restoration to active duties as housekeeper and mother of the family. This case "is a living argument that we cannot ignore," being present at Newport to-day.

Many more cases could be given. Moreover, we would like to go into the etiological part of the subject, but must leave the consideration of that for another time.

These cases were treated on a general plan after the following directions: Food, first and last, held to

as *the hope*; for we believed that unless the nutrition was placed on a normal basis there was little chance of changing diseased into healthy tissues. As the whole body is constantly undergoing change, we argued that if Nature could be given the greatest possible chance she would do her best to lay down healthy structures in place of the diseased. Medicines were not eschewed; instead they were used as oils for the machine, and in every possible way the healthy nutrition was helped along. There is such a thing as giving too much and also too little medicine; *every case is a law unto itself.* To treat cases of chronic disease requires a thorough knowledge of anatomy, histology, physiology, pathology, materia medica, climatology, diathesis, temperament and trophology. The patient must be watched by the clinical morphology of the blood, sputum, fæces, urine, and skin. The aim must be to get every gland in the body working accurately and easily, with the minimum expenditure of nerve force; and, our experience for it, if you can get the patient's nutrition on a healthy basis, if he will cease worrying and stop introspection, will place his hand in yours and allow you to lead him on, trusting you as a child does his mother, and you, putting faith in the means at hand, will also look forward to a cure, then, gentlemen, we believe that you will have the happy result of curing those commonly called incurable.

There is great difference of opinion as to the use of foods in treating disease; but the question is not of opinions but of the case which is being treated. A careful study of the patient once, twice, thrice a week or oftener is necessary, and the facts observed by morphological and chemical examinations will unerringly tell the practitioner whether he is right or wrong in the dietary he is using for his patient. Moreover, as cases improve, the foods allowed may be carefully increased in number and variety; and

here again the need of frequent examinations is impressed, to ascertain whether the healthy states induced by rigid dieting have become confirmed; if not, the case must be put back again till the system is ready for the more varied dietary.

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CLEANED WHOLE WHEAT

BY

EPHRAIM CUTTER, M.D., LL.D.

In August, 1884, I was at my brother-in-law's grist-mill and noticed the Michigan winter wheat as it came through the smut-mill, clean and fair, ready to be ground up into "Arlington (Mass.) wheat meal." The idea struck me, Why not use this cleaned wheat for food? It is free from dirt and contains all the form and chemical elements in proper proportions for nourishment that our Creator intended mankind should have when wheat is eaten. We do not crack or grind up other fruits, as tomatoes, bananas, potatoes, etc., a long time before they are eaten. Nor do we deprive them of their natural protective garments and mechanically separate their form elements, so that one-half at least of the nutritious qualities are taken away and fed to animals as we do in wheat. If the above-named fruits were subjected to such treatment they would become unfit to eat. Why not, I thought, get the aroma and bouquet of the wheat in the cooking, and not lose it in the milling? Acting on this impulse, I took home with me a half-bushel of the cleaned whole wheat and put my family upon it to see how long they could live on it without tiring. The experiment has been carried out up to the present time (a period approaching three years) with no signs of tiring. More time, then, must be taken to sicken my people of it.

NOTE.—This is not saying that we lived on whole wheat alone for the last three years; we have eaten other foods, but the wheat has been cooked daily and often has been placed on the table at all three meals.

MODES OF COOKING.

My wife, who is my authority, after many trials of hers and my own (in which I was laughed at) gives the following: To cook cleaned whole wheat—an amount sufficient for four adults—take one cupful of wheat, wash it clean in cold water; put it in a tin pail or crockery bowl, or other suitable utensil, and add one-half a teaspoonful of salt and three cups of cold water. Then suspend the pail in a pot of cold water, set it on a heated stove, and boil for eight or ten hours. Or cook for the same time in a double water-jacket boiler. (A common glue pot does well for small quantities.) Or cook for the same time in a "Chamberlain" or other steam-cooker. When cooked it should be soft, adhesive, glutinous and easily masticated. Serve with butter, or milk, or cream, or eat it without—as the Asiatics eat rice with no seasoning. If the cooking is well done, there is an agreeable nutty flavor of the wheat, which corresponds to the bouquet of grapes. This flavor seems to be lost when the wheat is cracked, crushed, or ground long before cooking. If this flavor is not desired, the cleaned whole wheat may be pounded in a mortar, or run through a coffee mill. This will shorten the time of cooking to four hours and less.

ADVANTAGES.

This is a perfect food and gives all the body's tissues a chance to be fed and nourished. It is intended that this should take the place of oatmeal, which has less gluten as compared with wheat, and is harder to digest. It is better than flour. Magendie fed dogs on flour exclusively, and they died in forty days, while other dogs thrived on whole wheat. Judge Abbott, of Bos-

ton, once told me of some shipwrecked sailors who were obliged to live on flour alone, and were nearly starved. They could have lived on wheat. It is more economical than flour. It goes further, feeds better and gives more nutritive results than flour. Hence when money is scarce and resources have to be husbanded (or "wifed," it may be more truly said), a resort to this food will be very satisfactory. The objection to the tegumentary coats is not so great as some suppose. I have practically tested this point to my satisfaction with my patients. This food is free from yeast, and hence less liable to fermentation in the alimentary canal. The danger of loss of health on this food is much less than on flour and sugar.

HOME MISSIONARIES.

When so much is said of the privation of Home Missionaries and their ill-health, in wheat-growing districts, the thought has occurred, How much might be saved if this form of food was well known, and popular! Even if there are no smut-mills, the wheat could be used, on a pinch, just as the old Roman soldiers lived on it, carrying a bag of wheat in one's pocket on his marches, and chewing it at will. The less sugar used the better, as all the starch of the wheat has to be converted into glucose before assimilation. If people were taught to use less sugar, they would know more about the natural flavors of different foods; would like them just as well, if not better, and have much improved health in the bargain.

Written for the Home Missionary; later published in the Medical Register, the Albany Medical Annals, the Medical Missionary Record, and the Popular Science News; Read before the Society of Science, Letters and Art, London.

American Institute of Micrology.

FOUNDED IN 1879.

Medical Department of Instruction.

EPHRAIM CUTTER, M.D., LL.D., Hon. F.S.Sc. (Lond.), Principal.
JOHN ASHBURTON CUTTER, M.D., B.Sc., Assistant.

THE ARISTON,

BROADWAY AND 55th STREET, NEW YORK.

SYLLABUS.

Lesson 1.—Principles of Microscopical Investigation; Studies of the Hairs of Man and Plants.
Lesson 2.—Biology and Morphology of Algæ; Diatoms; Desmids; Zygnemæ.
Lesson 3.—Œdogoniums; Saprolegniæ; Oscillatoriaceæ.
Lesson 4.—Bacteriaceæ; Vibriones.
Lesson 5.—Protococcaceæ; Palmellaceæ.
Lesson 6.—Biology and Morphology of Fungi; Yeast; Vinegar Yeast.
Lesson 7.—Protoplasms; Amœbæ; Infusoria; Rhizopods; Asthmatos Ciliaris.
Lesson 8.—Morphology of Food and Cooking; Bread; Infants' Foods; Drinking Waters.
Lesson 9.—Morphology of Dirt.
Lesson 10.—Morphology of Air.
Lesson 11.—Morphology of Urine.
Lesson 12.—Morphology of Fæces.
Lesson 13.—Morphology of Sputa.
Lesson 14.—Clinical Morphology of the Skin.
Lesson 15.—Morphology of the Blood in Health.
Lessons 16 and 17.—Morphology of the Blood in Consumption.
Lesson 18.—Morphology of the Blood in Syphilis.
Lesson 19.—Morphology of the Blood in Rheumatism.
Lesson 20.—Review.

Lessons one hour each. Terms on application.

It is not intended for the physician to master these, but to obtain some practical ideas of them. Men may deal practically with potatoes knowing nothing of their botany, and yet be good farmers. So may it be with the botany of disease. Medical practitioners can know enough to detect and destroy the parasites found in syphilis and consumption. Thus they will be qualified to express opinions as to the value of the microscope as a tool of precision in the diagnosis and treatment of these diseases.

Text-Books.—Micrographic Dictionary, *Griffith & Henfrey;* Primer of the Clinical Microscope, and The Clinical Morphologies of the Blood, Sputum, Fæces, Skin Urine, Vomitus, Foods, Clothing, Vaginal Discharges and Soils. —*Cutter.*

ADDRESS AS ABOVE.

HEARTREST SANATORY,

MOTT AVENUE AND 165th STREET, NEW YORK.

Address communications to Dr. John A. Cutter, Business Manager, The Ariston, Broadway and 55th Street, New York.

CIRCULARS OF INFORMATION.

No. 1. *General circular of information.*
No. 2. *Consumption of the Lungs.*
No. 3. *Diet in Tumor and Cancer.*
No. 4. *Bright's Disease, Impending Apoplexy, Paralysis, Cataract, and Fatty Heart.*
No. 5. *Asthma, Hay Fever, Bronchitis, and La Grippe.*
No. 6. *Heart Diseases and Rheumatism.*
No. 7. *Diseases of Women.*

The aim is to heal those cases of chronic disease commonly called incurable.

The Sanatory is located on high ground, in a square plot bounded on three sides as above and by Sheridan Avenue, commanding a fine view. The drainage is new; buildings are spacious and surroundings good.

It is approached by the West Side Elevated Roads to 155th Street, thence by carriage; from Grand Central Depot by Harlem Railroad to Mott Haven Station, thence by carriage; and from Melrose Station, on the same railroad, ten minutes' walk.

The results that we have achieved in our work in ***Heartrest Sanatory*** show the greater value of an institution of its kind than the means afforded in handling cases in private practice.

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The distinguished editor of the Louisville *Courier Journal*, Henry Watterson, has said that New York is the best watering place in the country. He is right.

Granted that many people fall in the streets, overcome by heat, during the spells of high temperature, and that the death rate amongst children rises at the same time. It must be remembered that on Manhattan Island are immense piles of brick and stone in our lofty buildings, and on the thousands of miles of streets millions of square feet of pavement, all of which absorb heat and throw it off during the night; also, that New York is the busiest and swiftest city in the world, and that men who have not learned to take it easy and "go slow" during the heated term will come to grief. The mortality amongst babes rises because they are poorly fed and, if living in the old-fashioned tenements, get but little air.

We have had some practical experience in treating children in dispensary practice amongst the poor. Go into a tenement that has been modelled out of an old house, and in one moment the sweat will be pouring out all over the body, the heat is so oppressive; but enter one of the newly built tenements, in which ventilation has been effected by shafts, and windows opening into them, and you will find it cooler than on many a farm.

Why? Because New York is surrounded by water and rarely fails to have breezes coming from it.

Our own home for the last five years has been on the eighth floor of a large apartment house. Some of us have lived in it all summer, and prefer such a residence to an outing in uncomfortable out-of-town resorts.

Our Sanatory, standing on a high hill within the city limits, in a large plot of land, away from granite-paved streets and large masses of brick, stone, and mortar, has, to us, solved satisfactorily the problem of a place for our patients, who need not be away from the centres of civilization, and yet may be comfortable and enjoy a beautiful view.

CAUSES OF HEART DISEASE.

SUDDEN DEATH LIKE THAT OF SECRETARY WINDOM MAY BE PREVENTED BY PROPER CARE AS TO FOOD.

To the Editor of the Tribune.

SIR: The sudden death of Secretary Windom in the midst of the life of a great banquet shocked the whole country more from the greatness of the man and occasion than because of the mode of death, which is alarmingly frequent throughout the land. Almost every *Tribune* reports two or three cases of people falling dead. Within a comparatively short time I can recall among my own family connections several such deaths. The time has come when any one who knows, or thinks he knows, of any new light on the subject should bring it out. In *The Albany Medical Annals*, *The Virginia Medical Monthly*, and at the 1890 Berlin Medical Congress the writer has done so. Secretary Windom's last words were almost descriptive of his own case: "As poison in the blood permeates arteries, veins, and heart, and speedily brings paralysis and death" (mark the word death), "so does a debased or fluctuating currency permeate all the arteries of trade, paralyze all kinds of business, and bring disaster to all classes of

people. It is as impossible for commerce to flourish with such an instrument as it is for the human body to grow strong and vigorous with a deadly poison in the blood." The point is, there are things in the blood which cause death suddenly from obstruction of the blood stream, and which come from improper food. Not that they act at once, but when they do act they act quickly. The heart is made big, irritable, weak, and diseased from overwork, which comes from the greater force needed to do its work. To these cases give proper food, and then nature will clear the blood, and the heart will become normal by having its load of work removed. Some of the ways in which improper food acts are :

1. Rendering the blood more viscid, adhesive, and sticky.

2. By filling in physical obstructions in the blood stream by making the normal fibrin filaments massive and large, forming threads, skeins, tresses, clots, and plugs which sometimes enclose gravelly bodies within. This gravel also is formed from improper food. This idea needs a volume to expand it in.

3. Fatty degeneration, from carbohydrates in excess and fermentation in the alimentary canal. This is a common cause of heart trouble, and the fatty degeneration may be found in (besides the heart) (a) the brain, (b) the kidneys, (c) the eyes, (d) the liver, (e) the muscles, etc. The common name of (a) is apoplexy, (b) Bright's disease, (c) amaurosis, (d) fatty liver, (e) fatty muscles, etc.

Now, the American idea of treating the heart when it is diseased from overwork, owing to the above-named causes in the blood, is to stop the bad food

and give good food. Nature will then remove from the blood stream the physical causes of obstruction, and the heart will come down in size and be restored, simply because it has no more than its normal work to do. This is a principle of surgery—to wit, to remove a foreign body from the eye, and the eye gets well of itself; nature will always cure if she has a chance. This is repetition, but there is need of it.

Few have any idea of the distance the blood has to travel in the human body. If the capillaries, which are 1-3000th of an inch in diameter, of the human body could be removed and put into one straight line, it is estimated that this line would reach round the globe; call it 1,000 miles, it is clear that it will take force to project water through such a tube, and that it would take more force to project molasses. Now, if the heart projects normal blood through this tube, it is also clear that it would have to work harder to project abnormally thick blood, and so doing would grow bigger. The nerves of the heart are automatic, and do their work in their way as the nerves of the head do theirs. They appear to know when there is obstruction to the circulation, and they make the heart beat harder. Death would result if the heart did not beat harder. Sometimes the contractions of the heart are so severe as to "break the heart." Time has proved the wisdom of lessening the size of the heart by proper food.

In fatty degeneration fat is deposited in the place of the muscle tissue of the heart. Fat deposited outside the heart is not so bad as when fat takes the place of the ultimate muscular fibrillæ. Now, what is to be done for this fatty degeneration? Take advantage of

the law whereby all our body tissues, except hair, teeth, and nails, change once in seven months (not years), to wit: Lay down healthy muscular tissues in place of fat. Can this be done? It can. It has been done so often that to some it has ceased to be the grand and wonderful phenomenon that it really is. This is attested:

1. By a return of the heart sounds to their normal loudness and distinctness of pronunciation. A fatty heart sounds weak and faint, as if covered with a woollen blanket.

2. By a return to normal size.

3. By the disappearance of the short breath, palpitation, pain, etc.

4. By ability to bear exertion.

When I was a medical student a snake was brought to be killed. It was in a deep empty glass jar, and a stream of carbonic acid gas was turned on. In a few minutes it was dead. All the gas was not used, but was turned on to the back of my hand; soon the skin was a livid lead color, was devoid of feeling and paralyzed. Now, this gas, largely formed in the stomach, becomes absorbed through the heart sac and paralyzes the heart. Probably this was so with Secretary Windom. He had eaten, and then he spoke. The force used in speaking was taken from the work of digestion, so that the food fermented; or he may have been drinking carbonic acid water, and the stomach was full of carbonic acid gas. Thence it exosmosed into the heart sac, and death followed. I knew a doctor (who knew better) to die from eating food which he knew would ferment, simply because he preferred the taste of his viands to their pathological effects. He is

not alone. So long as mankind lives to eat, and does not eat to live, just so long will sudden deaths from weak hearts occur. If such physiological sins could be cured by injecting lymph underneath the skin, such treatment would be immensely popular. But such treatment deals with results. The best treatment deals with causes. In the present case stop the causes —improper food and its results—and give proper food, and then nature cures. It is not a wonder that Secretary Windom died; it is a marvel that he lived as long as he did. If his previous history is correctly given, he had symptoms of heart disease for some time. He was liable to die any moment, as Dr. Sims died in bed, the Rev. Dr. Dexter on a lounge, Dr. Cowden at the bedside of a patient, Almon W. Griswold, Esq., on the Elevated road, and many others. We should be thankful that Secretary Windom was permitted to read his address, and thus splendidly close his life; for, so long as he lived on the conventional diet of starch and sugar in excess, no one could tell how long he could survive.

Again, Secretary Windom had treatment, but it was neutralized by a too close attention to business, and possibly by the late financial world-wide panic in which people looked to Government for relief for the evils brought on by speculation. People forget it is work to live—that each person has a limited amount of dynamic energy to expend in doing life work. Ten hours of brain-work a day are enough. Longer work than this steals from some other organ. If it is the heart, it will give out. If it is the stomach, it will not digest the food. If one has a broken bone and works too hard, the bone will not unite. So, when

people overeat, or eat food that is hard to digest, they put a like strain on their system. The love of the beautiful in eating kills many by making poison, or things that act like poison, in the blood. I have seen fatty degeneration of heart caused by phosphorus, which kills in twenty minutes. Again, it is said that snake's venom coagulates the blood more or less. Now, improper food coagulates the blood more or less. This invests the above quotation from Secretary Windom's last words with intense interest. It seems as if they were inspired. May we take warning! May our great men, whose lives are so precious to our land, eat to live, not live to eat, and may the time come when our public banquets shall have menus based on advanced physiological ideas as to food, and not on the conventional idea of nameless French cooks who exalt the æsthetics of the palate, eye, nose, and ear above the weal of the stomach, the heart, the brain, and the kidneys!

EPHRAIM CUTTER, M.D.

[The New York *Tribune*, March 1st, 1891.]

Ephraim Cutter, M.D., LL.D.

The recent election of this distinguished practitioner of medicine and scientist (whose professional writings number over 350) to the presidency of the American branch of the Society of Science, Letters, and Art of London, and the presentation of five papers and addresses by him to the great Medical Congress held in Berlin in August,* prompt me to give a brief account of his life and work.

Dr. Cutter was born at Woburn, Massachusetts, September 1st, 1832; was educated at Warren Academy, and was graduated from Yale University in the Collegiate Department in 1852. The following year was spent in teaching in Warren Academy, the next four at the Medical Departments of Harvard and the University of Pennsylvania, and was graduated from them in 1856 and 1857 respectively. His preceptors in medicine were his father, Benjamin Cutter (M.D. Harvard and University of Pennsylvania, and M.A. H. U.), Profs. Oliver Wendell Holmes, Henry I. Bowditch, and Josiah P. Cooke. From his great-grandfather, Amos Whittemore, the inventor of the card machine, he inherited not only inventive genius, but the most valuable attribute of an inventor—not to know what an obstacle is, and next the ability of telling mechanics just what is wanted. His father, Dr.

* "Food and Tubercle," "Physical Causes of Heart Diseases and Treatment," "Food in Fibroids," "Electrolysis of Tumors," and "Cutter's Stem Pessary."

Benjamin Cutter, honored his profession for forty years. The subject of this sketch did not wish to practice, but to study causes of disease. This he was encouraged in, and the result is not only most valuable facts gained as to causation of diseases, but a thoroughly trained practitioner, whose greatest delight is in attacking disease by stopping its causes. He practiced in Woburn and Boston till 1875, then in Cambridge and Boston till 1881. And at that time, at the advice of his friends, Drs. J. Marion Sims, L. A. Sayre, G. M. Beard, and E. S. Gaillard, he removed to New York, where he has since resided. Two of his sons are professional musicians in Boston. The third practices with his father in New York.

The following is condensed from a statement made by petitioners to the faculty of Iowa College for the degree of Doctor of Laws, which was conferred on him in 1887 :

INVENTOR OF

atomizer for dental anæsthesia, 1868; pessaries of Cutter, especially the stem, 1864–1871—English students of medicine are examined upon them before receiving degree; vaginal sound; electrodes and batteries, Nos. 1, 2, and 3, for electrolysis of uterine fibroids, 1872; vaginometer, 1866; new metallic suture, 1869; scarificator for laryngeal growths, 1868; scarificator for blood examination, 1868; écraseur for removal of growths from deep cavities, 1870; Eustachian catheter, 1871; new invalid bed for anchylosis of both hip joints, 1874, mentioned in Gross' "Centenary of American Medicine," 1876.

New vaccine virus cell, 1872; new retractors for thyrotomy, 1866; apparatus for rarefied and com-

pressed air inhalers, three kinds, 1875; ditto for resuscitation of drowning persons, 1875; œsophageal forceps, 1875.

Three forms of the clinical microscope, one of which is seen in photograph, invented between 1869 and 1875. These simplify microscopy, making clinical work at bedside, in cars, on the sea, in hospitals, etc., possible, and allow of the use of the highest power objectives, as, to wit, the one-fiftieth and one-seventy-fifth inch in microphotography, thus doing away with many details with which this art was bound up.

Cam fine adjustment with the late Dr. Elsberg for microscope stage, 1885.

Galvano-caustic holders, 1875; resting chair with fracture apparatus, 1873, now made in London; active and passive inhaler for nascent chloride of ammonium in acute diseases, 1874, now made in London; generation of steam with atomized fluids (in this country), 1870; new ear speculum, 1870; laryngoscope, and made by Alvan Clarke in 1859; new sponge attachment to bougies, 1868; treatment of sore nipples by cork shields, 1874; new hypodermic syringe, 1873; a stem pessary with movable disc, 1871, and improved 1889; digital thoracentesis, 1873; platina plated sound, 1886, now made in London.

FIRST TO OPERATE

For removal of laryngeal growths by external incision without tracheotomy, 1866.

By digital thoracentesis, 1873; to remove post-pharyngeal growths from the basilar process of the occipital bone with modified écraseur, 1870; with galvanism profoundly applied to uterine fibroids, 1871.

FIRST

In America to photograph the living human larynx, 1865.

To experiment with kerosoline as an anæsthetic by inhalation, 1860; to make microscopical examinations of ice, 1882, *Scientific American;* to use morphine snuff for hemicrania, 1870; to announce the philosophical principles of treating versions and flexions of the unimpregnated uterus, 1871; to use dry Indian meal as a vehicle for heat in medical practice, 1872; to use quinine ointment for sores, 1872; to treat Bright's disease of the kidneys with tripe, 1876; to demonstrate the erectile turgescence of the turbinated bones in inhaling pleasant or unpleasant odors, 1866; to use massive doses of iodoform in uterine disease, 1864.

To show that stem pessaries are a success, 1871; to penetrate the Eustachian tubes with slippery elm tents, 1869; to show that kine can be successfully vaccinated as a source of virus in times of stress, 1862, inspected by U. S. Army official, and method adopted by German government, called retro-vaccination.

To show that some cases of uterine disease are called consumption, 1883; to photograph alcoholic yeast with the one-fiftieth and the one-seventy-fifth inch objectives of Tolles, 1877.

With Geo. B. Harriman, D.D.S., of Boston, to photograph consumptive blood morphology, using the one-seventy-fifth inch objective for the first time in history of the world, 1876, in photography.

To photograph ague vegetations, 1884; to photograph starch, dust, cotton, lard, butter, and soap, with

the highest-power objectives, 1877; to discover the cause of pollution of Cochituate water to be due to decaying sponges, 1880 (see Liverpool, Eng., Sponge Museum).

To show that the surface water of fresh ponds is full of animal and vegetable life, though distant from the habitations of man, 1881; to demonstrate the cause of syphilis in the blood with the solar microscope, 1876; to use microphotography with the one-seventy-fifth inch objective, 1876, in connection with Dr. Harriman.

To point out that urinary protoplasmic catarrh was a cause of neurasthenia in men, and to treat and cure cases, 1882; to insist on passive inhalation of nascent chloride of ammonium in acute diseases of the air passages, in babyhood especially, 1874; to apply the principles of endosmosis to the living plant *in situ naturali* by chemical solutions, 1856; to write an essay on the pretubercular state, illustrated by many microphotographs, 1877; to record a remarkable instance of obstetrical operations occurring in flies and their newly born larvæ, which defy explanation, 1865; to write on the physics of cantation and phonation, 1872; to use glycerined sponge padding in surgery, 1873; to show the vegetable nature of croup, 1882; to apply the term morphology to the blood, sputum, urine, etc.

FIRST TO PUBLISH

Large number of cases of cure of consumption, 1880 and 1890; cures of Bright's disease by food treatment, 1889, 1890; on "diet in cancer," defining cancer to be "tissue under mob law," 1887, 1890; that enlarged hearts can be cured by food, 1887, 1890;

on the presence of lactic acid vegetations in mouth and bladder, 1884; on the morphological difficulty of baked beans as a food, 1887; that cooking may be tested by polarized light, 1887; that life insurance examinations can be made almost positive as to consumption by microscopical examination of blood, 1886; how beautifully alcohol dissects out the multipolar nerve cells of the brain of a calf, 1879; on "nervousness, food, and divorce," 1880; on "food as a pathologic, æsthetic, chemic, and physiologic," 1879; on "is flour our proper food?" 1875 and 1890; on "cereal foods under the microscope," 1882; on "suspicious organisms in the Croton," 1882; on "tubercle parasite," 1882; on "feeding in the wasting diseases," embracing consumption, Bright's disease, tumor, cancer, and male neurasthenia, 1890; first to found a school for the instruction in the morphologies of the blood, sputum, skin, etc., 1879.

Member Massachusetts Medical Society, American Medical Association, Committee of One Hundred Massachusetts Soldiers' Fund, 1862, American Society of Microscopists, Belgian and Italian Microscopical Societies, Philosophical Society of Great Britain, life member Delta Kappa Epsilon Club of New York, Gold Medalist, Boylston, 1857, Soc. Science Letters and Art, London, 1889, etc. WM. LUDDEN.

The foregoing excerpt from the *University Magazine* of October, 1890, is the record of a hard-working Deke; the young man that wished only to study causes of disease turned out to be a practitioner of medicine who has been a leader and promoter of several specialties.

In 1857 he received the Boylston prize for his essay on "Under what circumstances do the usual signs furnished by auscultation and percussion prove fallacious.?" In

1889, the gold medal of the Society of Science, Letters and Art, of London, for his essay, "The Relations of Medicine and Music." Recently he has named the false vocal cords *breath bands*, because of the work done by them in holding the breath, a newly-discovered function.

Dr. Cutter still continues his work, and has lately established the *Heartrest Sanatory*, where he has greater facilities to push his original studies and carry on the labor of patching up those worn-out and broken-down, who are usually put into that hopeless class, *the incurables*. What a boon to humanity the work of such a man is, who dares to fly in the face of established opinion and fight for the lives of those doomed by medical agnostics to die!

Judging by a recent conversation with Dr. Cutter, if, at his death, a belief has been established that what people eat and drink, and how they live, have more to do with the causes of disease than anything else, then his work in medicine will not have been in vain, in his opinion.

The subject of our sketch states that *AKE* at Yale was of great help to him; that Phi was thoroughly organized and did work of a high order; essays, poems and orations were often presented by Johnston, now President of Tulane University; Prof. Cooper of Rutgers; Col. H. McCormick, the iron duke of Pennsylvania; Judge Vanderburgh, of Minnesota Supreme Court, and others. He remembers once reading a poem of some length that was favorably received, but thinks that Yale men of his time probably have stronger remembrance of his efforts with the bass viol, now in his possession and daily used, than of his literary work.

His interest in music has not waned since leaving college, for he is on the committee to found a school of music at Yale, and has done much to improve choir and Sunday-school music.

His wife taught him the piano, and he married her—so he told the Yale Alumni Association of Fairfield County, Conn., in a paper on "Music at Yale"—in order that she might provide good music for his home; this she has done

successfully; the beauties of home music have made his life pleasant, and strengthened him while engaged in the onerous study and practice of medicine.

The Alpha Chapter at Harvard he had something to do with establishing, being at that time Secretary of Phi.

In closing, let me say that Dr. Cutter is the type of a class of medical men which must of necessity grow larger; *i.e.*, he has mastered, as far as present knowledge goes, several specialties by having been thoroughly grounded in a general education, general medicine and general practice, and by his special work in the study of causes of disease to relieve cases formerly called incurable.

St. Paul once said, and it is recorded in a very *learned* and *scientific* book, "The eye cannot say unto the hand, I have no need of thee; nor again, the head to the feet, I have no need of you, nay much more those members of the body which seem to be more feeble, are necessary. . . . There should be no such schism in the body, but that the members should have the same care, one for another."

Let the young Deke profit by these words, and the work of the subject of this sketch, especially if he wishes to study medicine and jump into some easily handled and lucrative specialty. That cannot now be done, for the people are learning what St. Paul knew, that the whole body must be known, if one wishes to treat "the ills flesh is heir to."—*From the Delta Kappa Epsilon Quarterly, July*, 1891.

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